

January 19, 1968

WEEKLY

AF revamps weapon system management to cut red tape . . Page 25

Manufacturers find new tool in small windtunnels . . Page 37

What to look for in buying business aircraft . . Page 41

# AMERICAN AVIATION



## THE ROOT OF THE MATTER

Orenda is pioneering many new concepts in jet engine design. The IROQUOIS supersonic turbojet, now producing over 20,000 lbs. (dry) thrust in its early development, incorporates several. The outstanding performance of the IROQUOIS, combined with inherent low weight, is the reason it has been selected for the Avro Arrow, Canada's new supersonic interceptor.

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Illustrated: Stress patterns in a jet engine blade root under load, using color photography and photo-elastic stress analysis.

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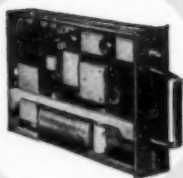
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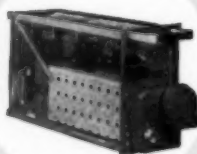


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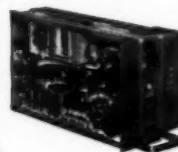
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AMERICAN AVIATION JANUARY



# AMERICAN AVIATION

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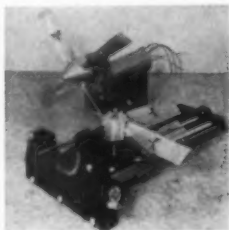
## The trend is toward turbines in helicopters

At Sikorsky, for instance, all talk is jet and the company probably will be 100% turbine-powered copter producer in about three years. For story, see page 31.



## Where the industry stands on windtunnels

There are about 230 of various sizes and types in the U.S. Typical of latest trend are the small blowdown types being used extensively. For analysis, see page 37.



## How do you decide on a business aircraft?

In the first of an exclusive series on executive fleet operation, two qualified consultants tell you how to determine your aircraft requirements. See page 41.



## Douglas reveals DC-8 interior layout

Some 67 representatives of 14 airlines buying the jet transport have made extensive studies of the prototype layout. For story and pictures, see page 52.



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Coming next issue . . . First of American Aviation's 1958 series of reader feature themes . . . an issue within an issue highlighting developments in aeronautical purchasing. Key editorial topics will include an exclusive report on how central purchasing saves \$\$\$ at Douglas . . . how punched-card purchasing by airlines affects industry . . . plus a "who buys what" directory of key purchasing officials among airlines, aircraft and engine manufacturers and military services.

# cham' pi·on: *the fighter whose record is written on aviation's most honored trophies*

Again, the aviation world salutes the F8U-1 *Crusader*. The Collier Trophy, one of America's highest tributes, has been awarded to the Navy and to Chance Vought for 1957's most significant aviation achievement: development of this record-smashing jet fighter.

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## Spotlight on the Manned Airplane

NO WORSE FATE could befall the United States than the neglect of the manned military airplane in the headlong rush to speed up missiles. Despite propaganda utterances to the contrary, the reports are positive that the U.S.S.R. is continuing quantity output of top aircraft.

We were much relieved, therefore, to see a go-ahead given to two major projects, the X-15 research airplane and the WS-110 high-altitude high-speed bomber—the “chemical bomber”—so called because of new fuels to be used.

These two projects will represent impressive advancement in the manned airplane field—but each in its own way.

The USAF-Navy-NACA X-15 research airplane, long the victim of budget cuts largely traceable to that anonymous but all-potent body of bureaucrats known as the Bureau of the Budget, is designed, among other things, for exploring the upper air to an altitude of 400 miles. A piloted aircraft, brought safely back to earth, can accomplish more in the way of scientific research than an unmanned missile can do.

More than that, the X-15 should be able to restore much of America's lost prestige abroad by circling the globe in an hour or slightly more. While such a flight may not have specific military value, it at least would give a resurgence to American technical supremacy and would be an achievement which the Soviet is not likely to be able to stage first.

The long-awaited WS-110 contract, awarded to North American Aviation along with the X-15, is something else again. Here will be a potent military weapon of impressive performance, although the completed article will not be accomplished overnight because neither engines or fuel are developed yet.

It is high time USAF got back into top running with advanced aircraft. The manned airplane, far from being outdated, hasn't been pushed anywhere near the end of its limits as yet. More and startling developments can be expected and if our betting is right, the manned airplane will keep apace with missiles in genuine scientific achievement and military strength.

## Less Than a Year

A year ago Trans World Airlines needed both a president and a jolt. It got both. Carter L. Burgess, then just 40, assumed the presidency with fanfare and vigor and set about giving the airline a shakedown.

The outlook was good. Burgess had previously worked for the airline shortly after World War II. He was fresh from an Assistant Secretary's post in the Department of Defense. He instituted economies, some of them needed, and set about putting the house in order. But in less than a year, he was out. The official reason was that he and the airline's owner, Howard Hughes, disagreed on policies.

The short-lived experience of Mr. Burgess again points up the hazards and complexities of airline management. Look over the roster of upper echelon industry executives and you will find no more than a handful of newcomers to the airline business since World War II who have survived. There are few men in management today, indeed, who do not date back beyond 1946 in some airline capacity or another. The industry has been extraordinarily ruthless and exacting in its casualty list of newcomers trying to make the grade. The toll has been heavy.

Airline management requires a peculiar type of experience and judgment not easy to acquire. If the industry is to acquire new leaders it seems clear

that these leaders must come from within and it must be said in all honesty that the present leaders (and proprietors) have been all too slow in developing executive material from their own ranks.

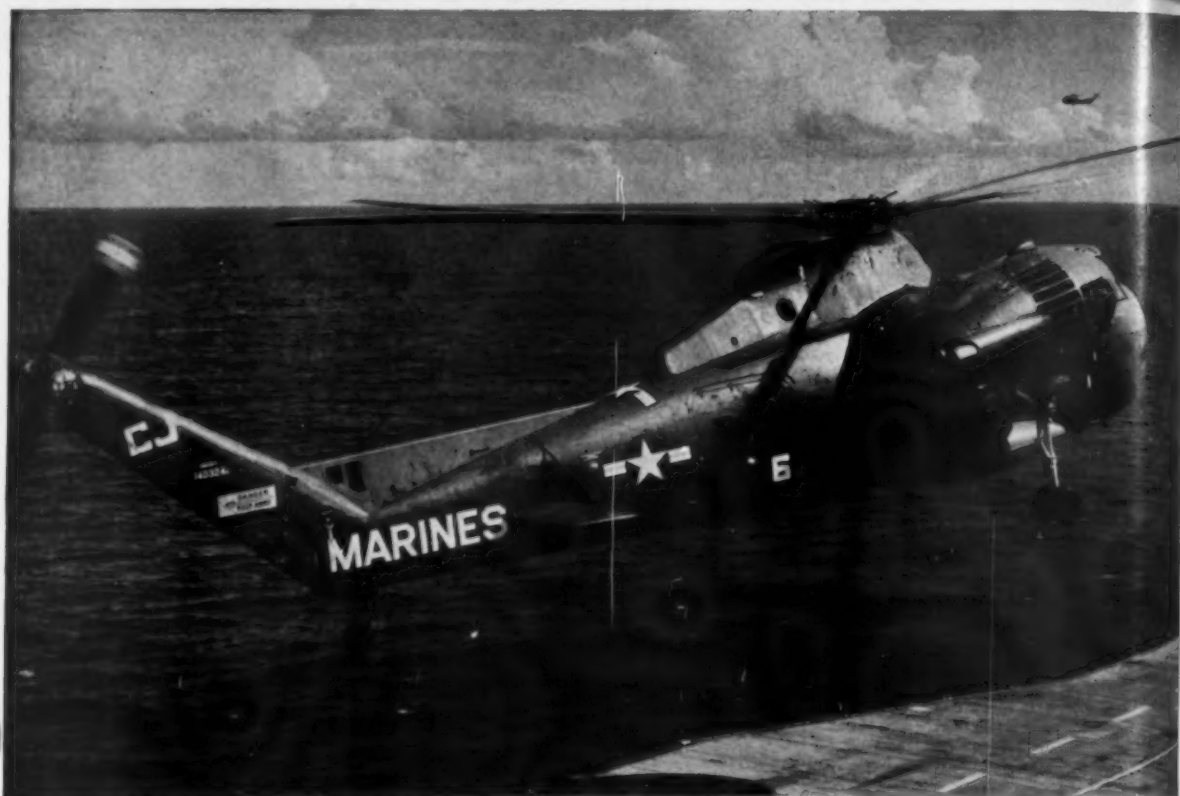
If experience of the past decade is any criterion it would seem that the chances of a newcomer taking over management reins successfully are the exception rather than the rule.

In the case of Mr. Burgess, he endeavored to compensate for his lack of airline experience with a headlong plunge and relentless drive which brought some immediate results in operations and passenger service but at the cost of a marked decline in employee and supervisory morale. It was a rough experience of all concerned. His successor faces an unenviable task.

TWA is again without a president, but perhaps Howard Hughes may have learned another in a prolonged series of useful lessons. Meantime the Burgess incident should give cause for thought in many companies. The time to train and upgrade experienced personnel to management positions is now. Too many capable leaders are forgetting that the days and months and years are moving on inexorably. To wait for stockholders, directors and bankers to bring in outside names will be waiting too long.

Wayne W. Parrish





**SEA DUTY**—Largest helicopter ever operated from an aircraft carrier is the twin-engined Marine Corps HR2S-1 (Sikorsky S-56), shown here landing aboard the carrier *Valley Forge*. Sikorsky HRS and HSS helicopters, seagoing veterans on a variety of Navy and Marine Corps missions, also flew from the carrier during recent fleet maneuvers off Guantanamo Bay, Cuba.

## AROUND THE WORLD WITH SIKORSKY HELICOPTERS

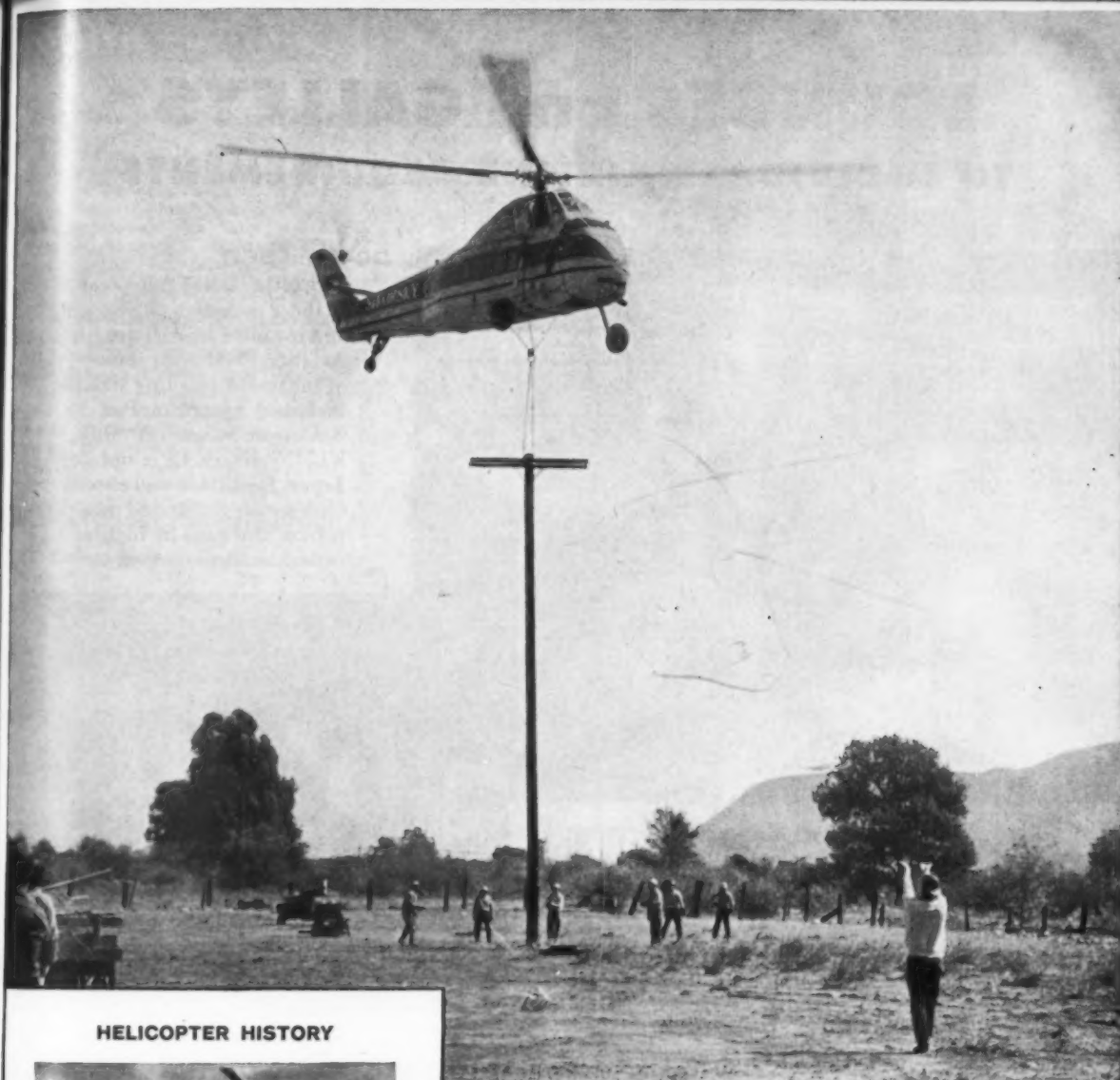


**MISSILE MOVER**—Army tests have demonstrated the ability of the big H-37 (S-56 type) to transport missiles, launchers, and support equipment as well as vehicles and other cargo. Here it unloads an Honest John missile. The H-37 normally carries 26 combat troops or about 3 tons of cargo.



**FOR EMERGENCIES**—Chance Vought Aircraft will use this Sikorsky S-58 for supporting the company's flight program and for search, rescue, and salvage duties. The S-58 will also be available in the Dallas area for disaster relief and other public services, and will transport high priority passengers and cargo.

Corps  
S heli-  
during



#### HELICOPTER HISTORY



#### FIRST MAJOR PUBLIC HEALTH PROJECT

In May, 1951, the government of Belgian Congo received the first of three S-51s to be used in aerial spraying to kill disease-spreading insects. Since then helicopters have flown many times over native villages like that shown here as well as over Leopoldville, helping stamp out malaria, sleeping sickness, and other diseases.

**SPEEDING POWER LINE CONSTRUCTION**—The Southern California Edison Company has erected high-voltage transmission lines more quickly using a Sikorsky S-58 helicopter to carry structural steel and other materials direct to tower sites in rugged terrain. The utility company's lines cross mountainous areas where surface transportation cannot operate efficiently. The big S-58, shown here installing a 50-foot pole, can carry two tons of cargo and move it wherever needed.

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## WHEN—WHERE

### JANUARY

Assn. of Local and Territorial Airlines, annual meeting, Washington Hotel, Washington, D.C., Jan. 20-21.  
 Aviation Institute for Commercial Carriers & Business Pilots, U. of Calif., Los Angeles, Jan. 20-Feb. 7.  
 Miami International Air Show and Exposition, Sertoma Club, Master Field, Opa-Locka, Fla., Jan. 22-26.  
 Agricultural Aircraft Assn. convention, Bakersfield, Calif., Jan. 23-25.  
 IAS annual meeting, Sheraton-Astor Hotel, New York, Jan. 27-31. (Honors Night, Jan. 28.)  
 Annual Midwest Welding Conf., Armour Research Foundation, American Welding Society, Chicago, Jan. 29-30.  
 American Astronautical Society, annual mtg., Engineering Societies Bldg., 29 W. 39th St., New York, Jan. 29-31.  
 Southern California Meter Assn., annual instrument short course, Los Angeles Harbor College, Wilmington, Calif. Jan. 30-31.  
 ASEE College-Industry conference, University of Michigan, Ann Arbor, Mich., Jan. 30-31.

### FEBRUARY

AIEE winter general meeting, Hotels Statler & Sheraton-McAlpine, New York, Feb. 2-7.  
 Industry-Service Symposium, flight control-panel integration, Biltmore Hotel, Dayton, Ohio, Feb. 3-4.  
 Reinforced Plastics Div. Conf., Society of the Plastics Industry, Edgewater Beach Hotel, Chicago, Feb. 4-6.

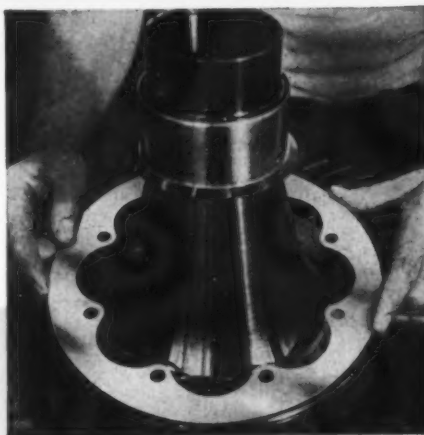
### MARCH

ASME Gas Turbine Power Div., conference and exhibit, Shoreham Hotel, Washington, D.C., March 2-6.  
 National Conference on Aviation Education, National Aviation Education Council, Mayflower Hotel, Washington, D.C., March 13-14.  
 Nuclear Congress, International Amphitheater, Chicago, March 16-22.  
 ARS-ASME joint aviation conf., Statler-Hilton Hotel, Dallas, March 17-20.  
 Interservice and Industry Symposium on Guided Missile Training Equipment (secret clearance only), Naval Ordnance Lab., Silver Spring, Md., March 18-19.  
 IRE national convention & radio engineering show, Waldorf-Astoria Hotel, New York Coliseum, March 24-27.  
 International Instrument Show, Caxton Hall, London, March 24-29.

### APRIL

ASME div. of instruments and regulators conference, University of Delaware, Newark, Del., April 1-3.  
 ASME maintenance and plant engineering conference, Penn-Sheraton Hotel, Pittsburgh, Pa., April 14-15.  
 ASME design engineering conference, International Amphitheater, Chicago, April 14-17.  
 ASME, AWS metals engineering div., joint conference, Statler Hotel, St. Louis, Mo., April 15-17.  
 American Helicopter Society annual national forum, Sheraton-Park Hotel, Washington, D.C., April 16-19.  
 Electronics components conference AIEE, IRI, EIA, WCEMA, Ambassador Hotel, Los Angeles, April 22-24.

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## AIRTRENDS

**There definitely will be a new "new look" defense program** as a result of Sputniks I and II. Abandonment of the philosophy that defense requirements must be tailored to economic expediency has been urged over the last few weeks by such groups as the National Industrial Conference Board, National Planning Assn., Gaither Committee, and most recently by the Special Studies Project of the Rockefeller Brothers Fund Inc. New philosophy is that the U.S. can afford what is needed—and that what is needed is and will be expensive.

**Proposals for further unification of the Army, Navy and USAF** and creation of a single chief of staff will be heard with increasing frequency. However, chances of action on these plans, most of which would either require legislation or Congressional concurrence, aren't considered good. The Navy is already fighting. And many Congressional leaders have expressed their disapproval or warned that there is need for extreme caution in proceeding with any drastic Pentagon shakeup. Danger is that the proposals will waste time and energy that might better be devoted to strengthening U.S. defense programs.

**A sharp increase is expected in defense spending for basic research.** The fiscal 1959 figure is likely to be boosted to about twice the fiscal 1958 total of \$80 million. And there'll be some urging that basic research expenditures by Defense Dept. could and should climb to as much as \$500 million a year within a short time. However, there is still a noticeable reluctance to step on the toes of the National Science Foundation, the government's basic research agency.

**Next rude shock from Russia could be** the development of aircraft nuclear propulsion. Meanwhile, indications are that the U.S. program, which has been in an "off-again-on-again" status since 1953, is now involved in a new inter-service rivalry. Navy wants permission to use nuclear propulsion for an atomic-powered seaplane for anti-submarine patrol. USAF wants the power developed for a supersonic bomber or for use in major reconnaissance programs. To avoid bickering, both services may get the green light.

**It isn't likely that allowable cost provisions** of the Armed Services Procurement Regulation will be revised this year. Latest of a series of drafts circulated to industry ran into solid opposition because of the attempt to extend the rules to cover contracts of other than the cost-reimbursement type. The ASPR committee is studying the industry comments before deciding whether to start over again, attempt a further refinement of the rules, or send them to Defense Secretary Neil McElroy. Informed sources indicate that the current impasse isn't likely to be solved any time soon.

**Value of the industrial reserve for mobilization** after a war starts is being questioned increasingly as emphasis on forces-in-being grows. This in turn is raising the question of what the services can or should do with some of the industrial plants built to speed production after the start of World War II and the Korean war.

**Look for debate in Congress on the place of** government-owned scientific laboratories and universities and arsenals in the expanded research and development program. Chances are that the trend toward limiting the efforts of government-owned labs and nonprofit organizations will be reversed, along with the philosophy that government should get out of competition with industry in this area. The compromise could be to attempt to draw a line which would force the shift to industry when a decision is made to build a prototype, and to order tooling earlier than has been the custom.

**For transport trends and news at deadline, see pp. 55-58.**



# INDUSTRY At Deadline

## U.S. must continue to buy manned aircraft and increase spending to survive, report warns

The United States will have to continue to buy manned aircraft for combat until well into the 1960s, according to a report prepared by the Special Studies Project of the Rockefeller Brothers Fund, Inc. made public Jan. 5.

The report notes that failure to purchase new and modern combat aircraft will result in an "unavoidable gap" in the ready forces between the latest type of manned aircraft and operational-stage ballistic missiles. "We cannot afford obsolescence of present weapons before new weapons are ready," the report said.

The importance of forces-in-being cannot be underestimated under present conditions, the report stated. It explained: "The importance of forces-in-being is magnified by the changed significance of industrial potential. As long as the destructiveness of weapons was relatively limited as compared to the complexity of their means of manufacture, victory in war could be achieved only through a quantity of equipment too large to stockpile before the outbreak of hostilities.

"Massive production of armament during the course of a war was thus a vital element of national strength and an attack on production facilities was a highly effective strategy. But with the

rapid and overwhelming destructiveness of modern technology each major power will, in the absence of massive and reliable defense, be able to disrupt the production facilities of its opponents with a relatively few weapons in a matter of hours. Industrial strength is therefore a military asset only to the extent that it can provide armaments before the outbreak of war."

The cost of maintaining ready forces while at the same time pushing hard the development of new technologies and new and advanced weapon systems will be costly, the report said. It estimated that defense spending ought to increase by approximately \$3 billion annually over the current rate of a little more than \$38 billion until 1965 at the earliest.

The writers of the report asserted that the United States can afford these expenditures. They said: "The price of survival is not low. The panel is convinced, however, that the increases in defense expenditures are essential and fully justified provided that the greater expenditure is coupled with increased efficiency. We can afford to survive."

The increased expenditures recommended by the group include provision for:

- (1) The "most rapid develop-

ment" and procurement of operational intermediate range and intercontinental ballistic missiles.

- (2) *Dispersal and other protective measures* for the base structure of the Air Force's Strategic Air Command. The committee found that the base structure of SAC has been "long out of phase with other elements of its program."

- (3) *Accelerated research and development* "for all key programs, including missiles and advance reconnaissance systems."

- (4) *Reduction of SAC alert time* to 15 minutes. In making this recommendation, the report noted that as Soviet reliance on missiles increased, maximum warning time would probably not exceed 20 minutes.

- (5) *Acceleration* of the Polaris program including missile launching submarines.

- (6) *Speedier development* of early warning and anti-missile defense systems.

- (7) *Increased pay scales* to help develop a "highly competent professional force."

- (8) *Procurement of modern aircraft* and modern ships to provide additional lift needed to assure mobility of the Army for action in the event of limited war.

- (9) *Re-equipping of allied forces*, particularly NATO, with modern weapons on an accelerated basis.

The report was the result of a study started in November 1956 under the direction of Dr. Henry Kissinger, associate director of the Harvard Center for International Affairs. Being privately financed, the report did not encounter the classification problems faced by the Gaither Report, which reportedly made many similar recommendations.

The Special Studies Project represents an attempt to assess the major problems and opportunities likely to confront the United States during the next 10 years. Some seven panels dealt with various aspects of these problems. The report on security is the work of Panel No. II. Others dealt with international objectives, foreign economic policy, domestic economic and social objectives, education and manpower, the democratic process and the "moral framework of national purpose."

The overall panel that considered these problems is headed by Nelson A. Rockefeller, chairman of the President's Committee for Reorganization of the Executive Branch of Government, who has occupied many posts in the Eisenhower and earlier Administrations. It includes some 32 members drawn from industry, economics, science, labor, publications and the universities. Many of its members have been close to the current Administration, while others worked for and with the earlier Administrations.

## F-104As: Assignment Air Defense Command

EIGHT LOCKHEED F-104As lined up at the Air Force jet center in Palmdale, Calif., are readied for delivery to ADC. Later, Starfighters will see service with Tactical Air Command. In background are T2V-1 and T-33 jet trainers.



## AEC fears Reds will get A-powered aircraft first as U.S. programs continue to lag

The next big crisis in the defense program will involve aircraft nuclear propulsion. Defense Dept. is now trying to determine what, if anything, should be done to speed the lagging program. Reports indicate that the Atomic Energy Commission, among others, is worried about the next big surprise from Russia.

There is more than a little fear that the surprise will be use of aircraft nuclear propulsion by Soviet Russia. In the meantime, both the Navy and the Air Force are arguing for a place in the program, which is under the direction of AF Major General Donald J. Keirn. And Congress is expected to have its say.

The Navy has long held the belief that a seaplane would be ideal as the first plane to use nuclear power. This was first disclosed during the development of early versions of the Martin SeaMaster, which ultimately crashed. In fact, informed Navy sources indicated that one of the reasons the SeaMaster ran into trouble was that the Navy attempted to jump one step in the effort to be first with the nuclear-powered aircraft.

There is a proposal before Deputy

Defense Secretary Donald A. Quarles calling for the development of a seaplane for use with a nuclear powerplant. To make this proposal feasible, it is understood that it would be necessary to establish water facilities for the testing of water-based planes designed to use nuclear reactors. Present facilities in the reactor program are at ARCO at Idaho Falls, Ida.

AF is arguing against this proposal for many reasons. Present concepts do not call for the use of the relatively slow, more cumbersome seaplane. It has moved ahead with its own program with design studies having been made both by Convair and Lockheed, which are reportedly at least partially successful. They are arguing also that most of the work in the period from 1949-1953 was financed by the AF.

Since 1953, the program has been in a kind of "off-again-on-again status" largely as a result of the former Defense Secretary Charles E. Wilson's expressed attitude that there was little to be gained by development of a nuclear powered aircraft. Potential of nuclear power—not so much for a bomber as for reconnaissance—is now of major concern.

## Renegotiation most serious financial deterrent to manufacturers, says Boeing controller

Boeing Airplane Co.'s controller, Clyde Skeen, says renegotiation is one of the most serious financial deterrents to the strength of industry, and that the Renegotiation Board "effectively confiscated a substantial portion of the incentive profits earned (by Boeing) under fixed-price incentive type contracts" for 1952 and 1953.

Speaking to the New York Society for Security Analysts, he called on Congress to "clarify the objectives of the renegotiation process and provide positive administrative direction to the Renegotiation Board."

Skeen said that the reduction in progress payments from 75% to 80% materially has increased industry's investment under government contracts, with the attendant increase in financial costs. "Since, in practice, these costs have not been considered in the establishment of contract prices, the full impact thereof has been against earnings."

In addition, when the Air Force imposed time period limitations, they were so severe that, despite the exercise of extreme economies and maximum recourse to bank borrowings, major reductions in all military programs would have been required.

After a revision of the plan, the peak rate per month of B-52F production was reduced by two airplanes at Seattle, attainment of peak production of the KC-135 was delayed by about

three months and moderate adjustments were made in the Bomarc program, Skeen said.

Defense Dept. limitations placed on cost-plus-fixed-fee contracts, limiting reimbursement to 80% instead of 100%, will substantially increase the level of bank borrowings of many com-

panies, he asserted.

Boeing sales for 1957 are expected to reach a new high of about \$1.5 billion. Earnings are expected to be more than last year's but the increase will not be proportionate to the increase in sales.

Sales in 1958 should be no lower than in 1957, Skeen predicted, and profit margins should be higher than this year's level. Backlog of orders Sept. 30 totaled \$2,533 million, including \$702 million for commercial jets.

Contracts under negotiation are expected to result in \$700 million more. Backlog does not include \$75 million applicable to orders for the 707 and 720 transports for which definitive contracts had not been signed as of Sept. 30, Skeen said.

## President asks \$1.37 billion in supplemental funds

President Eisenhower has asked Congress for 1958 supplemental appropriations of \$1.37 billion, part of it earmarked for the speed-up of SAC dispersal and alert status.

Of this, \$1.26 billion is being asked as new money and authorization for the transfer of \$110 million is included in the request to provide for an "emergency fund" and funds for a proposed Advance Research Projects Agency.

Air Force and Navy would split the new funds this way: Air Force R&D, \$30 million; for procurement "other than aircraft," \$360 million, and for construction, presumably of SAC bases, missile sites and other ground support, \$520 million; Navy R&D, \$22.2 million; procurement of ordnance and ammunition, \$31 million, and shipbuilding and conversion, \$296 million.

## Kaman jet copter to be built for Navy



MOCKUP of Kaman HU2K-1 helicopter powered by General Electric T58 engines. Craft features retractable gear, servo-flap control system. Kaman will produce a prototype quantity. It also has contract to produce H-43B turbine-powered helicopters for Air Force. Company has backlog of \$33 million. Note changes from original mockup (AMERICAN AVIATION, Nov. 18, p. 24).

### Manufacturing-military

**Brush Beryllium Co.** has received a \$330,000 development contract from Air Materiel Command to perfect a method of rolling sheet beryllium from pressed powder slabs. Program is designed to meet need for a lightweight material that will retain its strength over temperature ranges up to 1,500°F.

**Convair-Fort Worth** has established a department to concentrate on aircraft subsystems obtained from vendors. Robert Kahn, former materials manager, heads the new unit. Materials and outside production departments have been merged into a single unit under S. E. G. Hillman, former outside production manager.

**Naval Research Laboratory** has completed its Project Sunflare with the firing of a Nike-Asp rocket that reached 105 miles above the earth at San Nicolas Island off California. First 14 launchings were done with Nike-Deacon combinations which reached altitudes of 75 to 80 miles.

**Lockheed** has developed a push-button system it claims loads 35,000 lbs. of cargo into a C-130 Hercules in 40 seconds. The system also works in reverse and can unload the aircraft in the same time. Prototype is at Marietta, Ga., plant.

**Bristol Aero-Engines, Ltd.** and **ACES—Air Carrier Engine Service, Inc.**—will set up a repair and overhaul base at Miami for the Britannia Proteus engines and other Bristol-built turbines. Base is slated to be ready by September.

**Navy has rejected bids** submitted last month for four Martin Mars flying boats that were retired in 1956. Best bid for the 74-ton aircraft, which cost \$2.5 million each originally, was \$22,603.33, including two sets of spares that originally cost \$698,000.

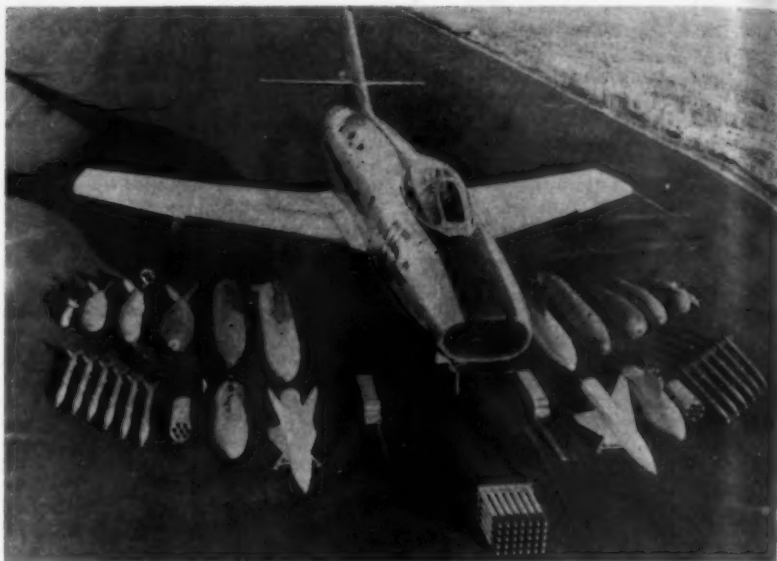
**United Aircraft Corp.** has received an extension to its contract for development of a nuclear powerplant for aircraft. The contract, renewed by the Atomic Energy Commission, will run until Sept. 30, 1960, at an estimated cost of \$15 million a year. Original agreement was signed September 1953.

**Armed Forces Management** magazine has prepared an up-to-date handbook of the Department of Defense. The 144-page manual may be obtained for \$1. Address orders to Professional Services Publishing Co., Inc., 1001 Vermont Ave., N. W., Washington 5, D. C.

**Don Ryan Mockler**, staff executive with Hill and Knowlton who has been assigned to the Aircraft Industries Assn. account for the past 14 years, left the firm and joined the AIA staff Jan. 1. He remains director of the Helicopter Council.

**Norman Warren** has resigned as vice president and director of advertising and public relations of Lear, Inc., effective Mar. 1. Future plans have not been announced.

### French fighter packs plenty of armament



**WARLOAD** of Dassault Super Mystere is seen spread out before French fighter. Stowed internally are two 30-mm cannon and 35 rockets. Slung externally are 38 rockets or two 1,100-lb. bombs. Alternatively the Super Mystere can carry externally two napalm bombs, two missiles or 12 heavy-duty rockets.

### NACA sets up committee on space technology

A special committee on space technology has been established by the National Advisory Committee for Aeronautics and will be headed by Dr. H. Guyford Stever, associate dean of engineering at Massachusetts Institute of Technology.

The new group will assist NACA's board of directors "materially in coordinating and bringing into sharper focus the already substantial and increasing effort of the NACA on problems of flight beyond the earth's atmosphere," NACA chairman James H. Doolittle said.

The committee will have about 15 members, each one a "leader in some aspect of the broad field." Appointments are expected to be completed during January.

In addition to his MIT position, Dr. Stever is vice chairman of the Scientific Advisory Board of the USAF Chief of Staff.

### Aircraft employment continues to decline

Revised, extended and canceled orders resulted in a dip in aircraft industry employment during the past year and, coupled with increased emphasis on missile production, will cause a further decline during the first half of 1958, Aircraft Industries Assn. reports.

The AIA statement cited the Pa-

cific Coast states, where employment dropped from 350,000 in January 1957 to slightly more than 300,000 by the end of the year. These states accounted for more than half of the industry's backlog Sept. 30.

The report said that 1958 employment should closely parallel that of 1956. Space requirements will not be as great as in the past and, although the manpower situation has been considerably alleviated, there is still a strong demand for personnel trained in engineering and scientific fields.

AIA said that the national backlog of commercial aircraft at the first of the year amounted to \$2.25 billion, with 704 units on order. Deliveries in 1957 totaled 330 aircraft valued at more than \$602 million.

### Chance Vought gets new order for F8U-3

Chance Vought Aircraft, Inc. has received a \$100-million contract to develop and produce the F8U-3 all-weather fighter. The Navy contract follows one for \$200 million for F8U-1 and F8U-2 dayfighter production.

The F8U-3 will be powered by the Pratt & Whitney J75 engine with afterburner and will carry air-to-air missiles. A Navy spokesman said the decision to go ahead with the advanced Crusader does not necessarily mean that the Navy will not award a contract to McDonnell Aircraft for the F4H-1, still under evaluation.

The F8U-3 is a single-seat aircraft expected to fly at Mach 2. The F4H-1 is a two-place plane.





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## LETTERS

### How CAB should act

To the Editor:

I congratulate you on the editorial in *AMERICAN AVIATION* for Dec. 2 (p. 7) entitled "How we think the CAB should act."

As one who was around when the 1938 Act was adopted—and even wrote a book explaining why—I would agree that Congress intended that CAB not allow such a financial crisis as now exists to continue. I have known Chairman Durfee for a long time and agree with you that he has the initiative and determination to face up to great issues and I, too, would bet on him to pull this one out on the right side soon.

Incidentally, I am probably traveling more miles, or as many, as anyone else in the country . . . and I find the airlines—by and large—are doing a very wonderful job and would certainly hate to see them stymied or stifled, as no one can do the job I have without them. **CHARLES S. RHYNE**, Rhyne, Mullin, Connor & Rhyne, Washington, D.C.

To the Editor:

I have just finished reading the editorial in your Dec. 2 issue, and hasten to congratulate you on writing it. Every bit of it makes good sense. You have put your finger on one of our real difficulties in pointing out the tendency of the Board to regard itself as a court. While some regulatory agencies may be able to behave like courts (the FTC is one), the CAB cannot. As you point out, the statute anticipates initiative on the part of the Board.

This is particularly true in our present situation, where the whole economic structure of the industry has wound up in a quasi-legislative or judicial proceeding. The Board has to be ingenious enough to maintain a properly judicial attitude and at the same time carry out its obligations. There is nothing inconsistent with the necessary procedural requirements, and the idea suggested by you of an industry meeting.

Your editorial is very helpful. **S. G. TIPTON**, president, Air Transport Assn., Washington, D.C.

### Pilots like editorials, En Route

To the Editor:

I hope that every congressman and every public official and all the taxpayers, too, read your editorial "Why the U.S. is behind" (*AMERICAN AVIATION* Dec. 10, p. 7). I think it is one of the best you have ever written. I agree 100%.

I like your En Route reports very much. **WALTER F. TUBB**, captain, Bonanza Airlines, Phoenix, Ariz.

To the Editor:

This is just a line to tell you I enjoy reading your column En Route in each issue of *AMERICAN AVIATION*.

I have flown throughout most of the world as either an ATC transport pilot or when I was with Seaboard & Western Airlines several years ago. The column surely brings back a lot of memories of sitting around airline ticket offices half the night waiting for something or somebody.

I am now company executive pilot

for Rexall Drug Co., flying a very well-equipped Aero Commander Model 680 all over the country, but not to the places you manage to hit.

Your editorial of Dec. 16 was tops. I wish everyone could read it. **EDW. J. McDERMOTT**, aviation dept., Rexall Drug Co., Los Angeles.

### Old friend remembers

To the Editor:

I was very interested in your story on Connellan Airways, (En Route, Dec. 16) who I have known for some time and do a job which always reminds me oldtimers of the early days when our setup in remote places was much the

same although we were supposed to be on-line.

I was interested in whether he was still doing the hunting trips for sportsmen who want to shoot crocodile, buffalo and other game which are often found up in the northern territory. At one time I think this was a very useful sideline but judging by your report, I should imagine he has enough to do with his present commitments. **P. E. BEWSHEA**, Sales Adviser U.S.A., British Overseas Airways Corporation, New York, New York.

### A hornet's nest

To the Editor:

The CAB was established by Congress to aid and regulate the economic growth and the operations of the nation's airlines. It was empowered to

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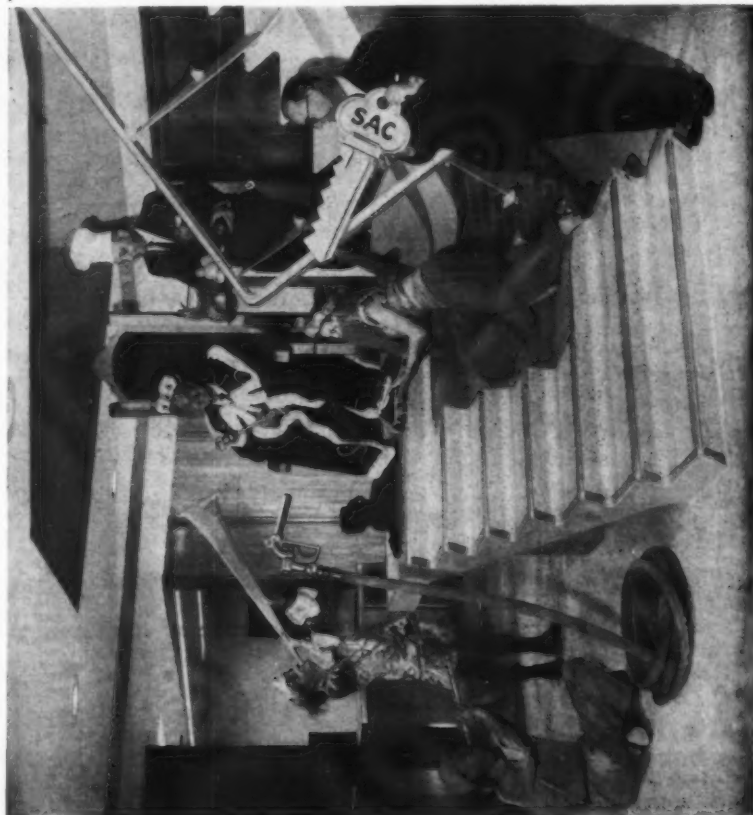
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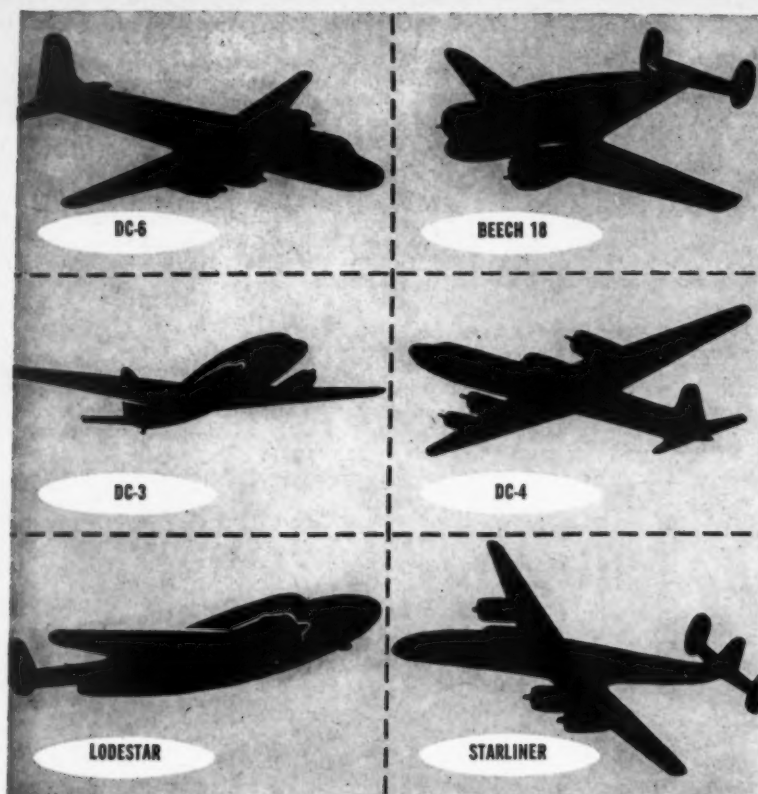


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regulate these airlines in and for the public interest and commensurate with the needs of our National defense. It was not formulated to interfere with the internal affairs of these airlines.

The fact that the CAB has regulated, almost into extinction, the airlines' privilege of granting free and reduced rate transportation to its employees and certain others is a misuse of the intent of Congress and the CAB's power.

In the past the pass privilege has been accepted as a fringe benefit, an advantage to working in the industry. For the airlines it has been a very economical benefit to its employees. The only cost to the airlines is the physical work of issuing and handling the pass. The space used has been on a space-available basis and thus has not caused a revenue loss by displacing a revenue passenger or cargo.

The loss of the pass privilege to the employee and his family will no doubt be compensated for in future union contracts and will increase the airlines' operating costs and will result in part of these costs being passed on to the traveling public as fare increases or as increased subsidies.

I am sure that, viewed in the proper light, you gentlemen will see that a hornet's nest has been stirred up, but one that can very easily be replaced.  
ROBERT G. MAIERS, Seattle, Wash.

### Kinda crowded up there

To the Editor:

Picked up the attached copy of a German magazine (see cut) in the lobby of a small hotel on Copacabana beach in Rio de Janeiro the other day. (This hotel is inhabited by airline folks; dog-



eared copies of AMERICAN AVIATION were there, too.)

I don't read German, but evidently it's a Sunday supplement of a Hamburg newspaper.

Thank goodness U. S. papers don't go quite this far in presenting to the public our own problems of crowded airways! JOHN H. TRUMP, DSM, Aerolineas Argentinas, New York City.

EDITOR'S NOTE: Translation of the main blurb on the cover of the German magazine: *Are the Skies Overcrowded?*

AMERICAN AVIATION





Scientist operates Cambridge-developed light gun used in the VOLSCAN air traffic control system. Use of the gun puts an aircraft "blip" under control of a computer which directs the aircraft to a timed landing under all weather conditions. U. S. Air Force photo

## CAMBRIDGE RESEARCH CENTER DEVELOPS SUPERHUMAN EYES AND EARS FOR AIR FORCE

At the Air Force Cambridge Research Center, in Bedford, Mass., the Air Research and Development Command has a broad program under way in electronics, geophysics and human engineering — and is expanding into many new areas in these fields.

The objective of much of the Center's electronics research is to improve the systems and instruments that serve as visual and auditory senses for the Air Force, making it possible to control and detect the incredibly fast missiles and planes of today and tomorrow. Such work has included development of "super systems," such as the SAGE air defense system, which provides coordinated aerial detection and interception over a vast area. Other projects include mobile, tactical air control systems (TACS); advanced radar for ground, aircraft and missile systems; automatic aerial traffic control systems, such as VOLSCAN; research in computer techniques, as well as creating computers for Cambridge's own use; and extensive work in communications, data processing, magnetics, radiochem-

istry, weapons control systems, and many other fields.

Cambridge is cooperating closely in the International Geophysical Year — as well as doing its own research into meteorology, auroral physics, storm detection and weather forecasting techniques, the upper atmosphere, meteor physics, jet stream research, and many other areas now becoming of intense interest to practical science.

This Center is also responsible for a broad program in "human engineering." It is concerned with research on hearing, speech intelligibility, and information processing by the human operator. Other studies involve the human limitations and capabilities of members of complex communications and control networks.

Cambridge, located at L. G. Hanscom Field, makes use of the talents of hundreds of government scientists and engineers — and also draws upon the brain power of a great many universities and colleges, as well as industrial organizations — helping to keep the United States technically second to none.



This is one of a series of ads on the technical activities of the Department of Defense.

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Engineer at Ford Instrument checks airborne data transmission equipment developed for Air Force traffic control application.

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Cleveland Pneumatic Tool Co.  
Hardman Tool & Engineering Co.  
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- 8 Aircraft Supplies  
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## SPOTLIGHT

Ryan Aeronautical Co. has developed a new type stainless steel skin for aircraft and missiles application. Process includes spotwelding foil-thin layers of stainless to corrugated steel. Samples have been supplied to specifications from most airframe contractors. Ryan claims its "open-faced sandwich" all-stainless construction is superior to the brazed steel honeycomb sandwich now being used.

Northern Aircraft, Inc., of Alexandria, Minn., which now holds rights to Bellanca production, is reported developing a six-place executive jet in the 500-mph category.

A new long-range version of the Matador surface-to-surface missile is in the works at The Martin Co.

Forward fuselage test section of a Northrop T-38 supersonic trainer will go to Edwards AFB this month for sled escape trials. Design test sections will come out of the jigs next, with prototype parts soon to follow.

Champion Aircraft Corp. of Osceola, Wis., is offering two new models in its 1958 line. The DX'er, which Champion calls "America's lowest priced business airplane," will have a 140-hp Lycoming engine, "high cruise speed and long-range fuel supply." New Sky-Trac for utility use also will have a 140-hp engine. Prices will be around \$6,500. The 95-hp Tri-Traveler and Traveler trainers round out the line.

A color radar system is being built by Gilfillan Bros., Inc., for Airways Modernization Board tests. Radar has seven channels for different colors, which might be used to identify various aircraft at one time.

There is a new Ryan Firebee target drone under development, boasting of larger fuselage, more electronics, better performance. Big problems with present Firebees: their size and fact they have such good performance that fighter pilots and missiles have difficulty hitting them.

Vertol's twin-turbine helicopter, designed to provide greater operational flexibility than present rotary aircraft, is nearing completion and is scheduled to fly in March. Project is a completely new design—not a modification. The H-21D and Model 105 turbine projects, demonstrated recently, were modified H-21s.

Rolls-Royce has several new "Flying Bedstead" devices in the works to test jet-lift projects built around the RB.108 turbojet. Two "Flying Bedsteads" were destroyed in accidents last year.

Among military projects to be transferred to Airways Modernization Board in the near future will be work on anti-collision equipment. A cooperative anti-collision system is being developed for Defense Dept. by Bendix Radio. Responsibility for this project will go to AMB.

Air Force is building a Northrop Snark missile base at Presque Isle AFB, Me., for Strategic Air Command. Cost of project is about \$12 million.

Bristol Proteus icing problem fixes now under test include a completely revised nacelle with a bullet-shaped cowl. All engine air is inhaled through NACA-developed flush intakes.

Cancellation of the Saunders-Roe SR-177 rocket-plus-jet interceptor is a big blow to the British aircraft industry. Aircraft was a half-way stage toward fully-automatic nonexpendable missile launcher. Actually, it was a radio-directed missile carrier of Mach 2.5, 100,000-ft. altitude performance, with greater range than a surface-to-air missile. It carried search radar, plus a pilot to resolve emergencies.

First CAA certification of a Federal tubeless autopilot, made by Industrial Products division of IT&T, was in a Piper Apache installation.



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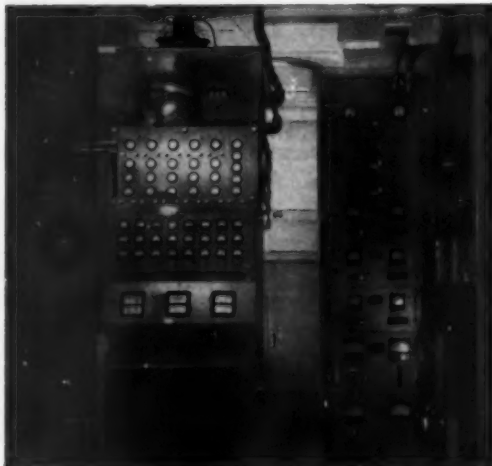
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The photograph (left) shows the inside of a "Minitrack" station, with the receiver rack in the center. Fastening the face panels on this rack posed a problem for Bendix Radio Division, manufacturers of the equipment. Because the frame is made of square tubular aluminum for greater strength, ordinary nuts and bolts could not do the job.

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## Out of the muddle . . .

*USAF acts to cut red tape and eliminate conflicts that plague weapon system management*

by Elizabeth Oswald

CHANGES ARE COMING in Air Force weapon system management concepts and regulations. The objective is to reduce lead-time and to eliminate the aggravations and conflicts that now slow decision-making in many cases to a walk.

As a first step, the Air Materiel Command is seeking to clarify its concept of weapon system integration and to spell out the interrelationships with such groups as the Weapon System Project Office, the Weapon System Phasing Group, the Equipment Management Groups and the Lead Air Materiel Areas.

At a later date, it hopes to provide a smoother transition from the Air Research and Development Command's Weapon System Project Office and will revise its regulation (70-9) which describes how the AF buys airborne equipment under the weapon system concept.

The first step was to put on paper, perhaps for the first time "AMC Concept of Weapon System Integration." Speaking of this work, Gen. Edwin W. Rawlings, AMC Chief said: "The application of this concept should improve the effectiveness of our efforts in assuring timely delivery and support of complete weapon systems into the Air Force operational inventory."

#### Other documents to come

Actually the paper to which Gen. Rawlings refers will be followed by other documents spelling out the procedures by which weapon system integration is to be accomplished. However, the job of putting the functions and responsibilities on paper points up the complexities of the weapon system itself and the organization that runs it. It also explains many of the delays in decision-making that add many years to the development cycle of new weapons.

Under the current concept, the Weapon System Project Office is a kind of "score-keeper" which acts as the focal point for the integrating and time-phasing of all USAF actions with respect to a given weapon system. However, since ARDC acts as executive agent during the first (development) part of a program and AMC acts as the

executive agent, once a decision is made to produce for inventory, there are frequently two Weapon System Project Offices that do not necessarily play by the same rules. This is one of the problems USAF hopes to correct later, and which it sought to overcome with the creation of the Air Force Ballistic Missile Agency.

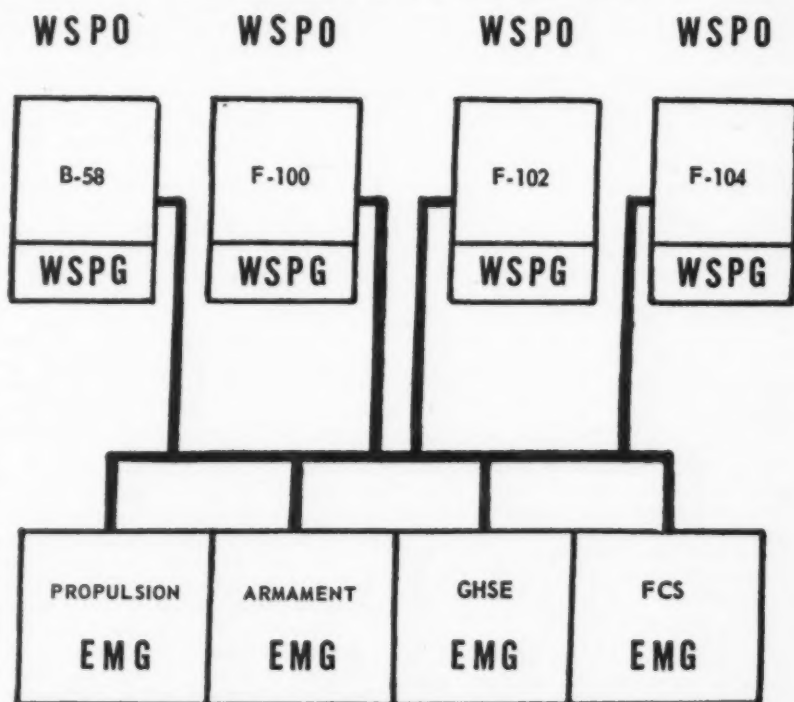
Once the decision is made to produce for inventory, AMC takes over, and executive management responsibility is centered in the appropriate airframe buying section of the Directorate of Procurement and Production. The Weapon System Project Office handles

executive management responsibility. Besides handling procurement and production, it is responsible for obtaining, integrating and consolidating the logistic support program. This is a responsibility it holds until about 12 to 18 months prior to the last production article.

#### Gen. Irvine stressed need

Equipment Management Groups assist the Weapon System Project Office in major subsystem and equipment areas. These groups integrate subsystem and equipment responsibility for the material not directly supplied to Air

#### RELATIONSHIPS: WSPO - WSPG - EMG



Legend: WSPO = Weapon System Project Office; WSPG = Weapon System Phasing Group; EMG = Equipment Management Group.

## Latest member of Cessna middle line, the Skylane



SPEED FAIRINGS on wheels are said to give Cessna Aircraft Co.'s new Skylane a 3-mph advantage over Model 182. Aircraft features new exterior styling and will be equipped with full instrument panel at package price of \$16,850 f.a.f. Wichita. Cessna hopes Skylane will help company capture more than 50% of general aviation sales in 1958.

Force by the prime aircraft manufacturer.

The need for more subsystem management has been stressed recently by Lt. Gen. C. S. Irvine, Deputy Chief of Staff (Materiel) who said that such integration of management responsibility was essential if the Air Force was to be able to assure subsystem compatibility.

Speaking of these Groups, AMC said: "The problems of the organization supporting such subsystem and equipment efforts are often as complex as those facing the WSPO in administering major aircraft programs. Separate research, development, procurement, production, supply, maintenance, training, transportation, budgeting and funding actions are required for items supplied by the government to aircraft manufacturers and for those equipments issued separately to operational organizations." And so the Equipment Management Group acts as a tool for all Weapon System Project Offices whose weapon systems use the equipment or subsystems assigned to the Equipment Management Group.

Finally, there is the Weapon System Phasing Group that has been charged with many of the delays in the decision-making process. However, the AMC document explains:

The Weapon System Phasing Group, which is made up of representatives of all elements of the Air Force that are interested in a specific weapon system, "is a problem-identifying and not a problem-solving agency . . . is not organizational in nature and has no self-contained authority. It is a committee type of operation and the responsibilities of its members are distinct and separate from the functional mission responsibilities assigned them in their basic jobs. It is a deliberative body designed to uncover and evaluate problem areas and to determine the functional areas which should take corrective action."

## Bipartisan support in Congress seen for stepped-up defense efforts

The second session of the 85th Congress is starting with a rush. Every sign points to the fact that it wants to know as quickly as possible what the status of U.S. defenses are, how much it will cost to increase the strength of the United States, what organizational changes must be made to assure the operation of research and development programs at peak efficiency and finally to find a victim for the current situation.

As matters now stand the current objectives have bipartisan support. They will probably continue to have that support until the Democrats try to make political capital out of the sudden fall from the comfortable complacency which led former Secretary of Defense Charles E. Wilson to say: "I don't believe the Russians are 10-feet tall."

The same complacency led both Wilson and the Administration to ignore the more than four-year-old warning of the late Gen. Hoyt Vandenberg, former AF Chief of Staff, against the perils of complacency.

The Congressional schedule in the first week of the session was indicative of the rush to get started. On Jan. 6, a day before the second session of the 85th Congress got under way, Sen. Lyndon Johnson (D-Tex), Senate majority leader, reconvened his Senate Preparedness Subcommittee to take further testimony on the state of the defense program. During the recess hearings, Johnson asked repeatedly, "What can we do to help push the defense program?"

On Jan. 7, just in advance of the opening of the session, the Democratic

caucus was convened by Sen. Johnson and briefed on the relative strength of the United States and Russia, particularly in the field of missiles. The group was briefed on the findings of the Preparedness Subcommittee.

Sen. Johnson was aided at the briefing session by Sen. Stuart Symington (D-Mo), Sen. Estes Kefauver (D-Tenn) and Sen. John Stennis (D-Miss), all members of the subcommittee. The caucus reportedly discussed the zealously guarded Gaither report and the somewhat less explosive report of the Rockefeller Foundation.

On Jan. 8, without waiting for the formal presentation of a supplemental budget request of about \$1.2 billion, mostly for missiles, the powerful House Defense Appropriations Subcommittee met in closed session. There was every indication that even the more economy-minded members of the group considered the program, as informally outlined, "conservative." There was little evidence that the request would run into any kind of trouble or delay.

On Jan. 9, President Eisenhower delivered a somewhat shorter than usual "State of the Union" address to a joint session of the House and Senate. The document, a closely guarded secret until delivery, was not available at press time. However, indications were that the message will assure Congress that, while much needs to be done, the U.S. is still dealing from strength with Soviet Russia.

He was expected to outline a broad program dealing with major expansion of U.S. science education programs and more money for basic research.

# Industry sales should hit \$10 billion in '58, but earnings may be lower

Aircraft industry sales are expected to run well in excess of \$10 billion during 1958, but the ratio of earnings to sales may be even lower than the 1957 estimate of 2.4%, Gen. Orval R. Cook, Aircraft Industries Assn. president, predicted in his year-end report.

Gen. Cook attributed this latter prospect to the fact that the government may impose additional restrictive procurement directives, now under consideration. He said industry employment will continue to decline to well below the 800,000 level and some additional facilities will be closed.

However, the AIA president pointed out, the pattern will not be uniform. Some companies probably will add to their employment and new facilities especially tailored to handle research, development and production of new weapons will be constructed.

## Military spent \$926 million for electronics in quarter

A total of \$926 million was spent by the military for electronics from major defense procurement sources in the first quarter of fiscal 1958, according to Electronic Industries Association.

This is a substantial increase over the \$637 million spent in the first quarter of fiscal 1957, but falls short of the \$1,055 million total for the final quarter of that year.

Budget categories in which the largest amounts were spent for electronics in the first three months of fiscal 1958 were: aircraft, \$340 million; missiles, \$273 million; electronics and communications, \$204 million, and research and development, \$73 million.

## Employment trends

The employment trend continues downward in the aircraft industry. The California Department of Employment reports that December's level of employment in the aircraft industry in the Los Angeles area has dipped to 194,000 compared with the spring peak of 230,000.

Bucking the trend, Ryan Aeronautical Co. reports that it will increase the payroll at Torrance, Calif., by about 800 or 1,000 by transfer of some of its DC-8 subcontract work. The DC-8 work will also absorb some of the personnel from KC-135 jobs as the learning curve of the latter improves.

Douglas Aircraft Co., meanwhile, announced that it will lay off some 200

By the end of 1958, Cook said, he expects guided missiles will account for more than 35% of the total military sales of the industry and unfilled orders for missiles will comprise at least 50% of the total military backlog.

The continued high level of sales in 1958 will result from increased deliveries of turbojet and turboprop transports and the increasing activity in missile work. These will offset the decline in unit deliveries of military aircraft which is expected to continue.

As Cook appraises the situation, the impact of Russia's scientific progress on the nation's leaders has created uncertainty as to our national defense goals and programs. "The decisions which will be made in the next few months will have tremendous influence on the aircraft manufacturing industry and its 1958 activities," he said.

employees at its Tulsa, Okla., plant. About 250 had previously been terminated because of the phasing out of the B-66 program.

Vertol Aircraft Corp. will reduce its payroll by about 1,000 employees during the first three months of 1958. In addition, salaried employees will have their pay checks reduced by 10% to 30% with the higher-paid personnel receiving the stiffest cuts. Layoffs will bring employment to about 2,000. Peak of 4,800 was reached early in 1957.

## Hiller UH12-D wins CAA certification



NEW UH12-D developed by Hiller Helicopters as a counterpart to its Army H-23D has been certificated by Civil Aeronautics Administration for commercial use. Three-place copter is powered by a Lycoming 250-hp engine.

## Manufacturing

Aircraft and parts manufacturers had a profit after taxes totaling \$281 million on sales of \$9,477,000,000 for the first nine months of 1957, according to Federal Trade Commission statistics. Sales for all manufacturing corporations totaled \$79.6 billion and earnings after taxes, \$3.7 billion.

Sikorsky Aircraft Div., United Aircraft Corp. has received a \$10,450,000 contract for HUS-1 (S-58) helicopters. Bell Aircraft Corp. has received a \$2,125,049 order for H-13A helicopters for Army liaison and reconnaissance missions, and Kaman Aircraft won a \$1 million contract for H-42A and H-42B conventional and turbine-powered helicopters for rescue work.

General Electric Co.'s light military electronic equipment department has received a \$5,009,000 contract for MA-8 fire control systems for the Republic F-105. System includes radar, automatic lead computing sight, toss bomb computer.

Cessna Aircraft Corp. reports sales of \$70,049,431 for fiscal year 1957, an increase of 6% over 1956. Earnings were \$3,866,000, or \$5.04 a share, after adjustment for a 5% stock dividend paid last March. Record sales volume was due primarily to 32% jump in military aircraft sales.

Sperry Gyroscope Co. is delivering the SP-30 flight control system which has been designated standard equipment on Martin P6M Seamasters. The system is said to provide automatic precision control over aircraft from 100 mph to sonic speeds.



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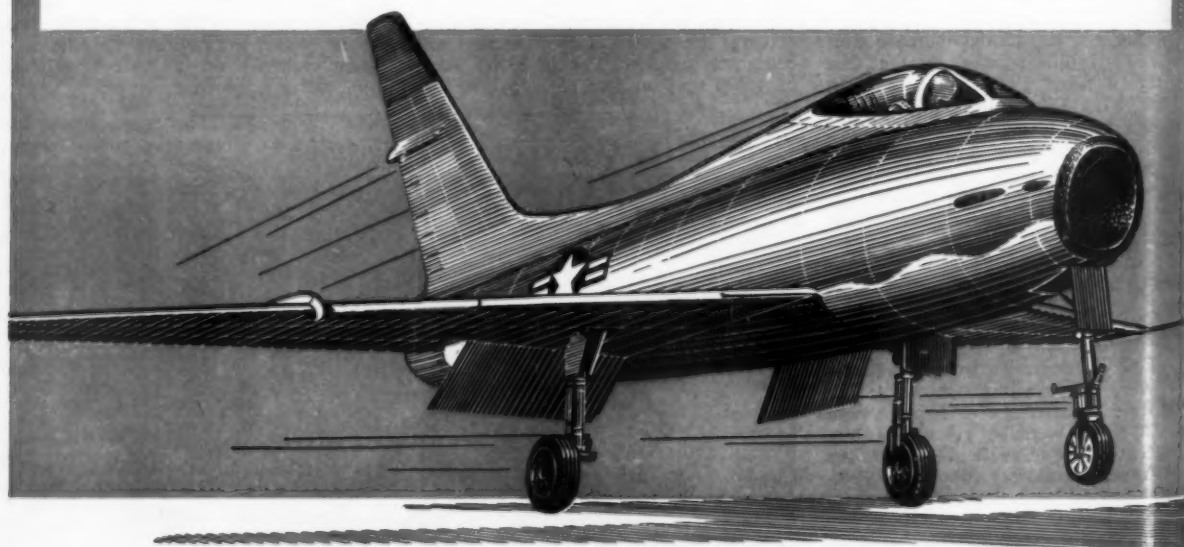


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AMERICAN AVIATION



# AMB shapes staff to unravel airways tangle

*Quesada sets up four technical groups; first analysis will be made of 50-mile area around New York*

by Henry P. Steier

**BIGGEST CHALLENGE** faced by Airways Modernization Board in 1958 will be to offer some evidence that its streamlined, systems-engineering-oriented organization offers the best hope for today's and tomorrow's aviation needs.

In terms of improved airways management during 1958, AMB accomplishments cannot be expected. However, its progress as the pace-setter in organizing air traffic control engineering management will be watched closely by the aviation community and should seriously affect 1959 Congressional action on aeronautical legislation. Such legislation may lead to a workable Federal Aviation Agency and may clarify the relationship of technical and operational members of the agency.

A somewhat sketchy, but the best currently possible, explanation of AMB's technical divisions and their plans to tackle airways problems was given at the Franklin Institute symposium on AMB in Philadelphia.

Following the Curtis Committee's recommendation to the President that the organization charged with modernization of airways employ systems engineering and its techniques, AMB has established four systems-related technical directorates under James L. Anast, deputy technical director. Appointment of a technical director is expected sometime in 1958.

The directorates are: *Operations Analysis, Systems Analysis, Systems Experimentation and Component Development*. First of the big AMB jobs falls to operations analysis.

Under Dr. R. H. Jordan, assistant technical director in charge of operations analysis, this group will tackle research on all facets of the present ATC system.

## Operations Analysis

Most of its work will be done on a contract basis at the beginning. First to be awarded covers what has been called a "Black Friday" analysis of delays in the air and on the ground which occur in a 50-mile area around metropolitan New York.

In this work, Airborne Instruments Laboratory will study delays using oscilloscope photography. The Franklin Institute will make an analysis of traffic by recording type, altitude and ownership of aircraft in the New York area. Studies will be made on one "Black Friday" and other heavy demand days in January, February and March. Similar analyses will be run in other dense traffic areas in the U.S.

Another operations analysis proj-

ect will be conducted by the University of California. This concerns high-speed runway turnoffs and their radius and placing for various types of aircraft. Tests will be conducted at McClellan Air Force Base, Calif. Lighting and marking of the turnoffs will also be studied.

A major project to be awarded on contract amounts to a continuation of work done by the Curtis Committee. This is forecasting of traffic for the next 20 years. The study will include analysis of flying in the U.S. and cover density, aircraft types and ownership, routes and altitudes used.

Other contracts contemplated will cover communications procedures, effectiveness of communications equipment and frequency bands in use, and relative accuracy of navigation systems.

Data obtained from these activities will go to the Systems Analysis directorate of AMB. That technical group will use the data to set up a future system plan, run simulation tests and go through mathematical techniques to determine the plan's practicality in the field.

After refinements decided through simulator and mathematical studies, plans will go to the Systems Experimentation directorate for real flight tests at an experimental facility.

According to Jordan, although

some operations analysis work will result in a number of "quick fix" solutions to current problems, this is not the long-range aim of the group.

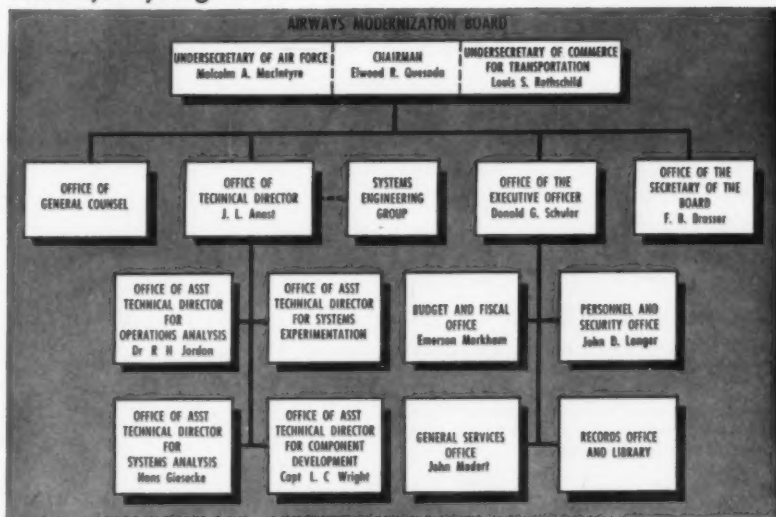
Typical of what they may come up with, Jordan said, is a technical manual which could be used by airport designers. A city planning an airport would, for example, use the book to determine optimum runway lengths, positioning and configuration of turnoffs, size of ramps and gate space that would be needed in 1970.

Jordan said his staff will be balanced with equal numbers of scientific and operational people with civil and military experience so the group can "keep its feet on the ground."

After plans developed by operations analysis have undergone trials through the Systems Experimentation directorate and are put into actual practice, work of the operations group will start all over again as its members go into the field to collect data on how the system works.

According to Anast, simulation work to be handled by the Systems Analysis directorate will first be done at CAA's Technical Development Center at Indianapolis. Later a simulator, which would be located at the proposed flight experimentation facility, will be developed so that experimentation can begin in 1959.

## Facts for filing . . .



PRESENT AMB organization is a mixture of permanent and acting appointees. Defense and Commerce representation on Board has been delegated to Malcolm MacIntyre and Louis Rothschild. J. L. Anast is acting technical director but also has been confirmed as permanent deputy director. Appointment of D. R. Jordan is permanent, Geisecke and Wright, acting, and Brasser, temporary. Asst. technical director for systems experimentation has not yet been named.

(AMERICAN AVIATION, Jan. 13, 1958)

The Systems Analysis group is headed by Hans Giesecke. Nothing has been said about industry participation in the simulation and mathematical model work. However, on the basis of past heavy involvement in this type of work, Franklin Institute Laboratories would probably participate.

Most comprehensive program already established by AMB is development of a data-processing and display equipment project for the New York City area. After receiving 14 proposals for this experimental facility, AMB has announced it is negotiating with General Precision Laboratory, Inc. on the prime contract.

This system is to be part of AMB's five-year program designed to serve aviation's immediate needs.

Confirmation of the actual award is not expected before Jan. 10. According to an AMB spokesman, none of the proposals was complete in every detail. For this reason it is expected that other companies that submitted proposals may participate in portions of the contract work.

AMB is said to have selected GPL because the group which it headed made a proposal that offered the greatest immediate advantages together with long-term possibilities.

It is understood, however, that AMB may shift relationships around and select companies which are to work together under the prime contractor.

Effort of AMB with this project is to take care of today's ATC situation

so that capability of the system will be increased during the period of 1960-63. Actual tests of the system are not expected before January 1959.

Lt. Col. Carl B. Fisher, USAF, special assistant to the Technical Director, AMB, heads the group which will handle the experimental system when it goes into operation. Group includes traffic controllers, pilots and engineers.

Reportedly the contract award for the overall final New York system may amount to \$10 million. One major company said it had spent \$100,000 on writing its proposal.

To handle equipment development work, AMB has organized a Component Development directorate. This is headed by Major L. C. Wright, USAF. This group is expected to handle Air Navigation and Development Board and Air Force projects transferred to AMB, and new projects such as 3-D and color radar.

One of the transferred projects is the RAPCON II system and associated work. RAPCON II is a high-performance military terminal air traffic control system. AMB will incorporate this development into the overall AMB project on data-processing and display.

According to Fisher, AMB's five-year program calls for three time stages. During the first stage, from January 1958 to January 1959, collection and assembly of experimental equipment will be accomplished.

During the second stage, which

will take 18 months, experimentation and modification using simulation and live aircraft will take place.

Stage three will entail moving the initial experimental model, debugged and tested, into the New York area, where it will be service tested in a live environment. These tests will take about 18 months.

It is expected that during or after the third stage, production specifications will be prepared for equipment to instrument the entire New York area. Listed among the automaticity requirements to be included in a final contract for this equipment are:

*Flight plan filing from user operators.*

*ETA computation and routing to fix positions.*

*Flight strip printing and strip updating.*

*Clearance message storage in a computer for canned voice message operation.*

*Reception of SAGE position and identification data.*

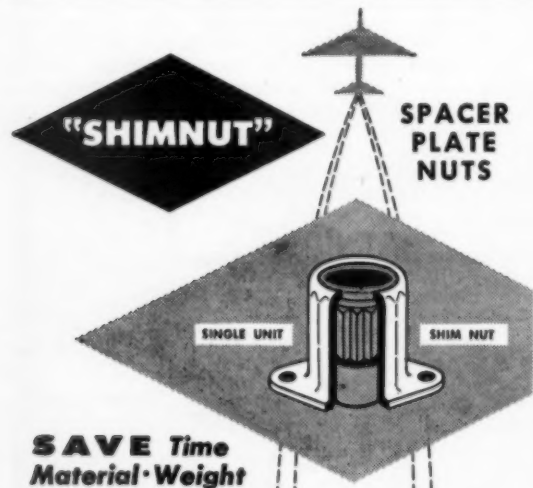
*Transmission of position data and identification to SAGE.*

*Display of identity, raw radar data and extrapolated position data.*

*Scheduling computer for terminal operation.*

*Flow-control computation and display.*

*Collision prediction for manual collision resolution (tentative).*



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## Will small turbines boom copter business?

*Sikorsky, for one, expects to shift virtually 100% to jets in three years; flight tests encourage move*

by William O'Donnell

THE TALK at Sikorsky Aircraft is all turbine. Not that the company is ready to drop all work on piston-driven helicopter projects, but indications are that the rotorcraft manufacturer is committed to become approximately 100% jet in about three years.

The company now is flying an S-58 helicopter with two General Electric T58 free turbine engines mounted in place of the usual Wright R1820.

In development at Sikorsky are the single-turbine S-62 and several twin-turbine models.

Sikorsky engineers feel that the arrival of small turbine powerplants is a preliminary step in a coming helicopter boom. The favorable power-to-weight ratio and the compactness of such engines as the T58 are cited as a means of doubling the ton-mile-per-hour capacity of existing copters. The turbine advantage, coupled with airframes designed with turbines in mind, promises to bring operating costs substantially more in line with those of fixed-wing aircraft, the engineers say.

Flight tests of the turbine-powered S-58 have shown that faster cruising speeds, greatly increased payload capacities, substantial reduction in weight, greater endurance and vastly increased ton-mile capacity are possible. Simpler controls, less vibration and noise are among other advantages.

These factors (plus twin-engine safety in many cases) and all-weather capability are expected to increase sales of helicopters by as much as three-fold during the seven or eight years after they become available. Commercial sales are expected to account for most of the increase and for the first time will meet or exceed military sales. Some 2,500 commercial and military transport helicopters are expected to be in operation by 1965.

Sikorsky's experience with Army's turbo-shaft XH-39 and turbine-driven S-58 has resulted in the company's decision to install the turbines above the cabin area just below the main rotor. This will allow greater cabin capacity and permit greater flexibility in distribution of the payload. Sikorsky plans to hold to the configuration of one main rotor and the small torque compensating rotor at the tail.

The T58 testbed is using a General Electric-supplied gear box but later models will use a Sikorsky-designed

box. This decision resulted when it was discovered that a weight saving and improved efficiency could be effected.

"Design of this gear box represents one of the problems in transition from pistons to turbines," Miller A. Wachs, chief of Sikorsky's component development branch, points out. "Because of the high-speed nature of the gears, we are faced with the need for greater precision in manufacture. The reduction between the T58 turbine and the rotor

is about 100 to 1, from 19,500 rpm to 200 rpm."

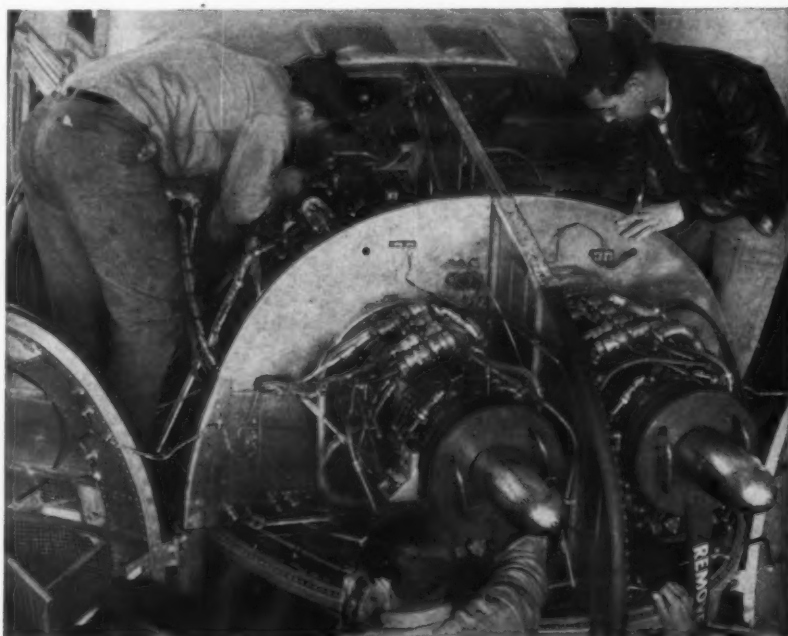
Other items to be considered are cooling the high-speed gears and reduction of gear box noise.

Wachs said that deletion of a clutch in the turbine drive system is a big improvement and eliminates the source of a lot of trouble inherent with the piston types.

He added that turbine-powered copters will retain the free-wheeling



SIKORSKY XH-39 single turbine helicopter built four years ago for Army. Location of Turbomeca Artouste II engine above cabin represents Sikorsky thinking for later single- and twin-turbine helicopters.



S-58 TESTBED has two General Electric T58 free turbine engines installed in nose. Turbines replace single Wright R1820. Model has been flying since February.



feature to provide autorotation safety in event of flameout.

E. F. Katzenberger, chief of the general design branch at Sikorsky, said the company's turbine helicopters will be equipped with a new rotor speed control mechanism. A Hamilton Standard rotor speed governor alters fuel flow to the engine through an electrical control system which is sensitive to speed of the rotor blades.

The rotor blade pitch is the primary variable and the fuel flow the dependent variable—just opposite to the system used with piston engines.

Sikorsky chose this control following the National Advisory Committee for Aeronautics investigation which indicated it was preferable to a system in which fuel flow is the primary variable.

#### Automatic control

The control automatically changes the engine power output to maintain the rotor condition previously set by the pilot.

Other items considered in the transition to turbines include:

**Effect of air flow at engine entry—**So far this has not presented any difficulty. Turbine suction during hover or slow forward flight seems sufficient.

**Cooling power—**Turbine uses fuel oil cooler. The flow is low. A problem has been encountered in cooling the immediate environment of the engines.

**Lubricant—**The no-warmup feature of the turbine is limited by the characteristics of lubricants. In extreme cold the lubricant must be warmed before loads can be put on engines. Sikorsky is pushing for an all weather lube, effective at temperatures of  $-65^{\circ}$ .

**Engine removal and replacement**

—Sikorsky employees have made turbine changes on a twin-engine mockup in as little as eight minutes. Change on single-turbine S-62 may be faster.

**Center of gravity—**High mounting of turbines has no detrimental effect on helicopter's center of gravity. Location of engine almost directly below rotor and Sikorsky's offset flapping hinge on rotor blades allow greater CG range.

**About the engine:**

The T58 engine was developed by General Electric and Navy's Bureau of Aeronautics to meet helicopter requirements for a turbine in the 800-1,500-hp class. It is a free turbine design, consisting basically of the gas generator and free turbine assemblies.

#### Engine makeup

The gas generator consists of a 10-stage axial-flow compressor, combustor and two-stage turbine. Inlet guide vanes and first three stages are variable to control air flow, increase low-speed stall margin and minimize blade vibration and fatigue stresses. A single-stage of the turbine drives the output shaft.

N. N. Davis, manager-evaluation GE T58 project, points out that while fuel controls and associated engine control parts always have been a problem in development of a gas turbine engine, helicopter rotor systems and associated gearing and drive shafts pose a far more severe design problem from the standpoint of constant speed control.

Davis said that the much greater flexibility of rotor blades and their required lag hinge attachments to the rotor shaft create an elastic load on the engine. The elasticity is aggravated by backlash in the gears of the transmission and speed reduction system. In

addition, the twist of the relatively long drive shaft increased the elasticity even more.

He added that the T58 had its share of control troubles but substantial improvement has been made and all T58s now are being fitted with improved fuel controls.

#### Cessna YH-41 sets three altitude records

A Cessna YH-41 helicopter piloted by Capt. James E. Bowman, U.S. Army Aviation Board, Fort Rucker, Ala., set new world altitude records of 30,355 ft. in two weight categories, and 28,200 in a third weight class.

The record flights were made Dec. 28 at Wichita, Kans., under the supervision of M. J. Gordon, National Aeronautic Assn. representative. Records are subject to confirmation and acceptance by the Federation Aeronautique Internationale of Paris.

Previous helicopter altitude record was 26,931 ft. established by the Sud Aviation Alouette June 6, 1955. Before that, the record was held by a Sikorsky S-52-1 helicopter—21,220 ft. on May 21, 1949.

The record-breaking YH-41 was equipped with a pilot oxygen system. The YH-41 is the military version of the CH-1B, four-place CAA-certificated helicopter powered by a 270-hp Continental piston engine.

New records are:

**Unlimited weight category—**30,355 ft., previous record 26,931 ft.

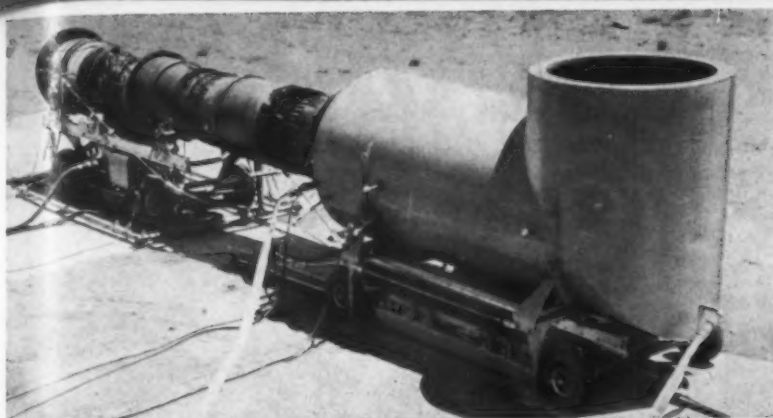
**1,102-2,204 lbs.—**30,355 ft., previous record 26,931 ft.

**2,204-3,858 lbs.—**28,200 ft., no previous record.

SIKORSKY S-62 will be powered by a single General Electric T58 turbine and will feature partially-retractable landing wheels and a water-tight hull to permit on-water landings and takeoffs. S-62s will use the same rotor blades, rotor heads, gear boxes, shafting and other equipment as the piston-driven S-55. The turbocopter's empty weight will be 700 lbs. less than the S-55.







AIR LOGISTICS CORP. Model 11,000 sound suppressor set up for controlling noise of Pratt & Whitney J57 engine with afterburner. Overall length is 194 in., width 96 in. on trailer, maximum height to top of stack 115½ in. Hose line carries water to suppressor. Portable tie-down pad is directly under engine tailpipe.

## Air Log noise suppressor adaptable to any jet

Air Logistics Corp. has unveiled a portable jet engine noise suppressor which company officials say provides an effective and inexpensive means of noise reduction and can be adapted to any jet aircraft configuration.

The 8,000-lb. unit operates on the principles of dissipating the high-turbulence areas of the exhaust cone, reducing the velocity of exhaust gases, cooling the exhaust gases by means of secondary air and absorbing noise in the body of the suppressor. When engines with afterburners are being run, water cooling is available as an added factor.

Labeled Model 11,000 by Air Logistics, the suppressor is part of a jet engine run-up and test system designed as a universal, lightweight and mobile means of running and testing jet engines. The system is said to be able to handle engines up to 33,000 lbs. thrust with a safety factor of three.

Included in the complete system are an instrument and control cab, fuel tank assembly, engine tie-down assembly, two transportation trailers, a positioning trailer, the suppressor, suppression tie-down assembly, and auxiliary power supply units.

Air Log officials say the suppressor affords protection of personnel in the immediate area of an engine operating at full power against the pain, strain and inconvenience of the noise generated.

The unit also eliminates nuisance noise to adjacent activities and communities by permitting the engine sound "to become saturated in normal environmental noise at distances over 500 ft."

Air Log has tested the unit under actual conditions and has found that Model 11,000 meets both military and commercial requirements.

Noise reduction varies from about 40 decibels inside a radius of 50 ft. to 19 decibels at 1,000-ft. radius from

the engine running at full power. Tests were conducted with an unshrouded engine.

Noise measurements were made with an H. H. Scott Type 440A sound analyzer.

## 'Cooperative' repair kits being prepared for USAF

Repair kits are now being prepared for the Air Force covering some 582 end assemblies, mostly in the category of aircraft fuel, hydraulic, vacuum, oil and de-icer systems. A total of 30 companies are participating.

The procedure, which adopts a practice long in effect in the automotive repair industry, calls for the purchase in kits of bits and pieces for repair of specific end items. Cost of the bits and pieces range from five cents to a dollar.

Studies in which six companies took part indicated that it was more economical to replace such low-cost items on a 100% basis when repairing specific end items. The companies were: Adel Div., General Metals Corp.;

AiResearch Manufacturing Div., Garrett Corp.; Eclipse-Pioneer Div., Bendix Aviation Corp.; Pesco Products Div., Borg-Warner; Thompson Products, Inc., and Vickers, Inc., Div. of Sperry-Rand Corp.

Savings include: (1) reduction of the many actions required in requisitioning and scheduling spare parts for the maintenance shops; (2) fewer line stoppages; (3) reduction of packaging costs; (4) provisioning, item description; cataloguing and research; (5) reduction of individual stock locations; (6) simplification of bill of materials and maintenance handbooks.

## Safety experts fix causes for 285 USAF accidents

Failures and malfunctions of brakes, drag chutes, wheels and tires were the primary cause or contributed to the damage or destruction of 285 Air Force aircraft during the two-year period ended June 30, 1957.

This figure was disclosed by Maj. Gen. Joseph D. Caldara, USAF Director of Flight Safety Research, at the 31st USAF/Aircraft Industry conference in Palm Springs, Calif., attended by 180 safety experts from 22 states and Canada.

P. M. Hershey of the Firestone Tire and Rubber Co. said aircraft tire users should be critical of multiple retreads, because they can expect more tire failures and less safety with each succeeding tread life.

He said that in jet aircraft, on which high tire temperatures are developed, retreading should be viewed with caution when considering maximum safety.

Drag chutes have more advantages than disadvantages and probably will be used for some time to come on military aircraft, said Kenneth E. French, chief engineer for the R&D center of Irvin Air Chute Co., Glendale, Calif.

The problem of directional control of a drag chute is difficult to solve, he said, but it may be possible to develop an attachment that would move the chute off center to apply a yawing or pitching moment.

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## **for Convair conversions**

The Brazilian airline REAL Transportes Aereos do Brasil of Sao Paulo is to convert three of its fleet of piston-engined Convair airliners to Napier Eland turbo-props.

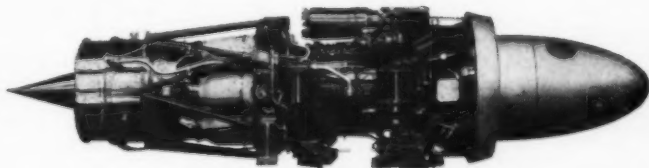
REAL states that it intends to convert its entire fleet of Convairs—another 17 aircraft—after assessing the results of the first conversions. With the substantial increase in power, range and speed, these converted Convairs will show a high financial return. Improved operating flexibility, lower maintenance costs, and long component life and reliability in all conditions are all attributes of the Eland made possible by its advanced and fundamentally simple design. Passenger appeal too will be high because of the smooth, quiet journeys which the propeller turbine brings to modern air travel. And the extra 2,000 h.p. available will enable the aircraft to carry its full payload when operating from high altitude airports and at the highest ambient temperatures.

This Napier conversion scheme can be introduced into certain other piston-engined airliners, besides the Convair, with no less impressive results in operating efficiency.

Napier Engines Inc., a subsidiary of D. Napier & Son Limited, with its headquarters in Washington DC., has been recently formed to support the Eland conversion program in North and South America.

NAPIER ENGINES INC., Suite 909, Dupont Circle Building, 1346, Connecticut Avenue, N.W.  
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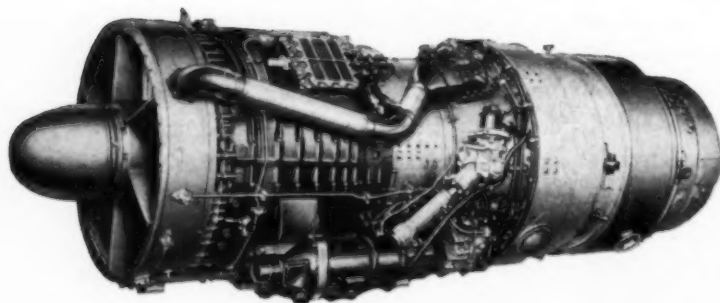
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## Exclusive Report

## Where we stand on windtunnels

by Richard van Osten

THE MODERN WINDTUNNEL has come a long way from the fan and tube era, especially in the past five years. As a result, more tunnels are being built today than at any time since John Smeaton first suggested the use of an artificial wind-generating machine back in 1759.

There are about 230 windtunnels of various sizes and types in the U.S., ranging from small laboratory units of a few square inches to a huge 16x16-ft.-square Air Force facility at Arnold Engineering Development Center, Tullahoma, Tenn.

Most older tunnels are continuous-flow types in which a constant stream of air flows around the test vehicle. However, the costly equipment necessary to provide high Mach number air flows has made airframe manufacturers look to the intermittent or "blowdown" type when investing corporate funds in a tunnel facility.

Typical of trends in current design is the \$3.5-million 4x4-ft.-square blowdown tunnel under construction at Convair-San Diego. A similar tunnel is being constructed for Chance Vought at Dallas.

Company-financed, Convair's unit is designed for Mach 0.5 to Mach 5 speeds. The blowdown choice becomes obvious when the cost of the 8,000-hp motor for the air system is compared to the cost (and availability) of a 150,000-hp unit required in a continuous flow tunnel of the same capacity.

In the Convair tunnel, compressed air at 600 pounds per square inch is stored in six tanks with a total capacity of 28,000 cu. ft. Two to four "blows" from 20 to 60 seconds duration can be made per hour depending on test requirements.

Up to about Mach 5, air temperature is not too critical a factor, but Convair uses two methods to maintain the specified limits.

For a basic system, each tank contains a bed of alumina balls as a thermal mass for temperature stabilization. To maintain a more precise control in the desired operating range, a bypass system takes air from between the second and third compression stages, routes it through a heat exchanger and sends only as much air to the tunnel inlet as required to maintain the specified temperature.

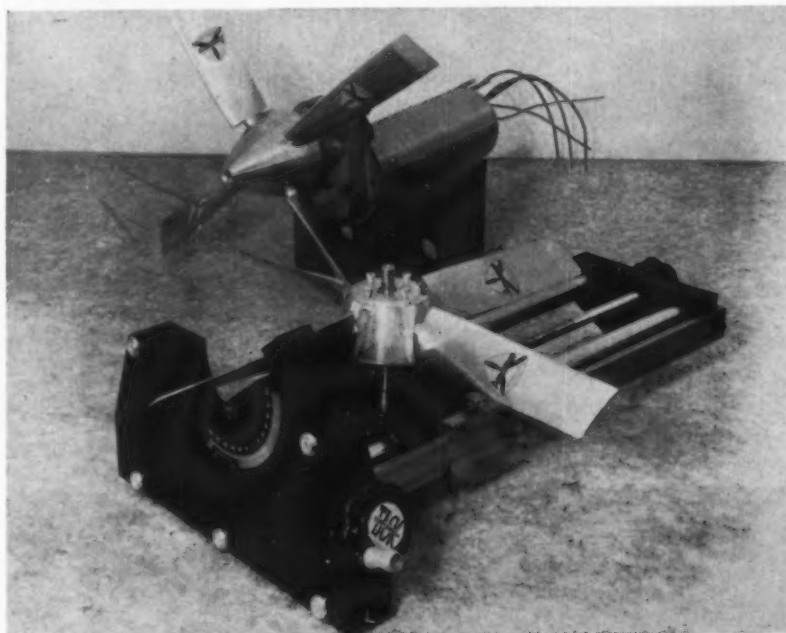
Between the compression stages, air is cooled in an intercooler through which nearby San Diego Bay water is pumped at 3,600 gals. per min.

In cost plotting for the desired Mach number, pressures required, running times, etc., Convair decided a 4x4 tunnel was the most economically feasible size for a given Mach number. This thinking is apparently a popular approach as 4x4 units are being built by Boeing, Chance Vought and McDonnell.

Another factor that probably influenced Convair's decision was the company's successful experience with F-102 tests in the Ames Laboratory 4x4 tunnel.

ponents in small models, particularly control surfaces, variable ducts, etc. Now the company feels tunnel size must be governed by how small a model can be and still contain all testing requirements.

Banking on its success with a 1/10-scale model of the F-100, NAA decided to stay with models of approximately the same scale. This made it necessary to have a tunnel to carry this scale of larger aircraft yet be large enough to avoid data-spoiling "wall effects."



A PROP-BLADE angle-setting jig and a high-cycle motor for testing turboprop models. This set-up is for a Grumman test.

One possible drawback of the 4x4 tunnel is the limited model size, but this is a controversial area.

One engineer put it in the lap of the model builders:

"If the model is right, any tunnel will do—providing it is larger than the minimum tunnel for which the model was designed."

Others believe a big tunnel and model is a better way of producing accurate data. This philosophy is shown by North American's new 7x7-foot facility in El Segundo, Calif., a design based on experience with small models in small tunnels.

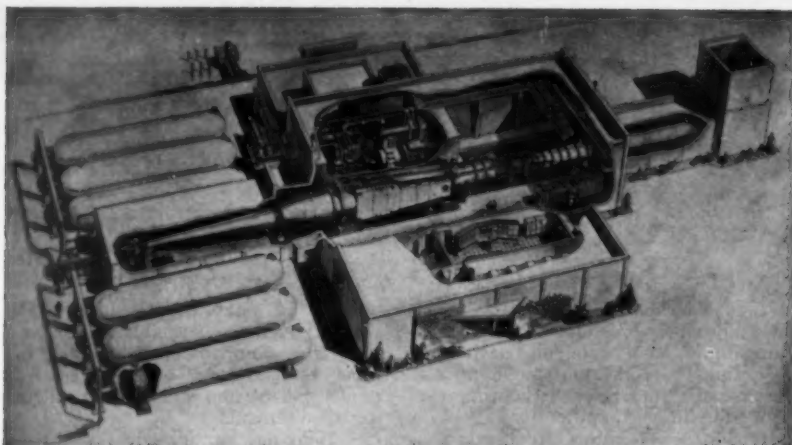
NAA had encountered some past difficulties in installing movable com-

The determination of what model size is to be used is important. With model costs running from \$25,000 to \$250,000, it is desirable to use the same scale for all tests.

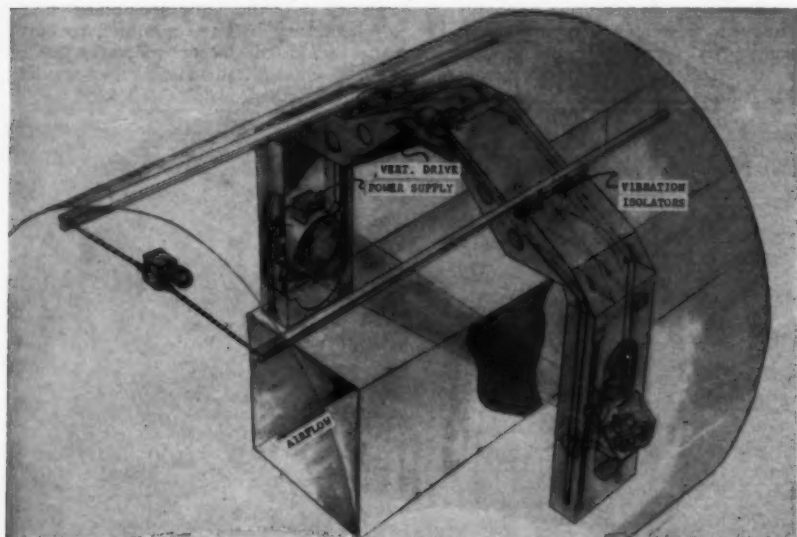
High Mach numbers have little effect on the tolerances to which a model must be built. As a North American engineer puts it:

"Tolerance requirements are no more rigid than they were in tunnels 10 years ago. You build as near as you can to .001 inch and on some parts to .0001 inch."

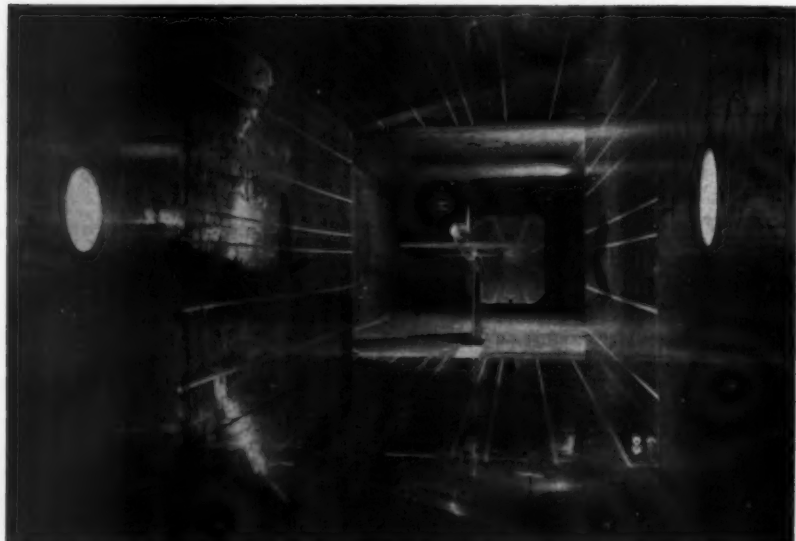
The \$5-million 7x7 tunnel is an economically practical investment, the company says. It believes the facility will pay for itself in about 10 years or



OVERALL LAYOUT of Convair-San Diego's new tri-sonic windtunnel. Interchangeable transonic section is stored to lower right of supersonic and subsonic section.



PROPOSED multiple-source Schlieren system designed for the 16x16-ft. transonic tunnel at Arnold Engineering Development Center, Tullahoma, Tenn.



INTERIOR of North American's 7x7-ft. blowdown tunnel. Model is mounted at downstream end of perforated-wall transonic section. Portholes are for Schlieren system viewing in supersonic section.

less through savings in time and travel for high-priced personnel.

Tunnel time is expensive. It can run as much as \$2,500 per hour. NAA spent \$323,000 for F-86 high speed and supersonic tests, but reached over \$1.1 million for the F-100.

Operating costs for the new tunnel will vary between \$300 and \$750 per hour, but NAA claims its Auto-netics-designed data system will make it possible to reduce the number of tests required.

Similar to the Convair tunnel except for size and the fact that no removable sections are required, the NAA unit uses 11,000 hp to fill the 214,000-cubic foot air storage system. One-half hour is required to refill the system after each run.

In place of alumina balls for a thermal mass in the storage system, NAA uses 9,600,000 tin cans (fruit juice and beer rejects). This concept holds the temperature drop to about 30°F and takes up only 2½% of the available space.

The 55-ft.-long flexible nozzle was designed in the company's Model Design Group which also designs test models, and the perforated wall technique is again used in the fixed transonic section.

#### Specialists design nozzles

Although NAA designed its own nozzle, many of the tunnel-builders have contracted with specialists in the field, such as Fluidyne, Minneapolis, which designed much of the Convair tunnel. Other design specialists include Svedrup and Parcel, St. Louis, and Sandberg-Serrell, Pasadena, Calif.

The short nozzle versus the long is a continuing controversy. The short nozzle is less costly and saves space, but its opponents say it reduces boundary layer thickness and may cause separation.

Long-nozzle enthusiasts admit the possible penalty of a thick boundary layer, but claim a regular flow and a generally smoother Mach number distribution.

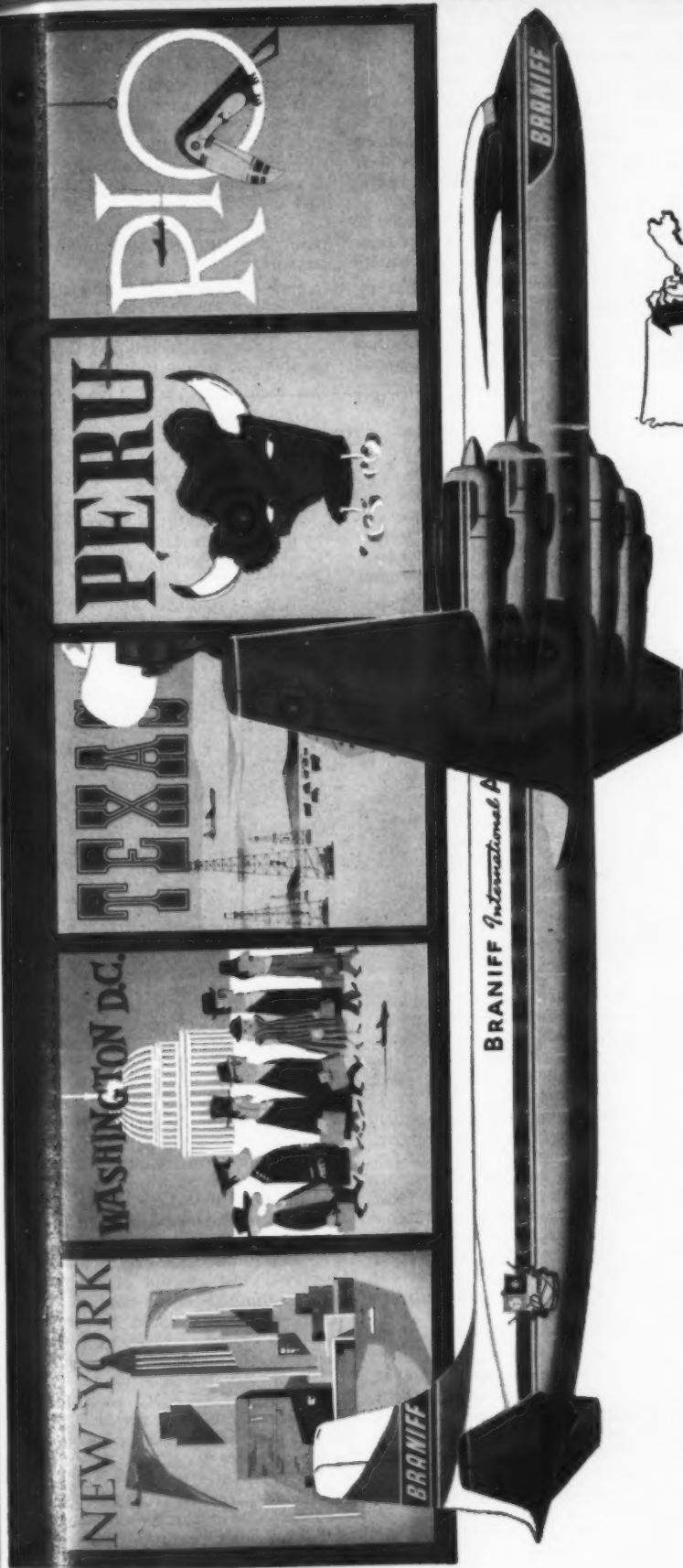
More controversy concerns placement of transonic sections at the end of a supersonic nozzle—some say it can be done, some say it can't. But much of the discussion is a result of only limited experience with large area blowdown tunnels.

Tunnel operators are concerned also with the starting loads on a test vehicle. Much more experience will be needed to determine whether models can stand the impact or whether some new technique will be required.

The flexible nozzle is usually actuated to a predetermined contour for a specific speed range by a series of hydraulic jacks behind the nozzle plates. In North American's tunnel, each jack must be set manually by adjusting a stop and then applying hydraulic pressure to "set" the jack against it. Convair's jacks may be set either manually or automatically from a central control panel. It is not yet



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believed practical to change jack positions during a run.

The flexible nozzle seems to be excellent up to Mach 5, but there is some thought that the narrow opening required by higher speeds is causing problems. Considerable research is under way on a three-dimensional or circular nozzle which duplicates the flexible nozzle's rectangular area. Said to provide a more stable air flow, a nozzle of this type is being developed for an Army Ordnance program in a Mach 8-plus tunnel at Aberdeen, Md.

A "backup" for the program will be furnished by a conventional nozzle in Jet Propulsion Laboratory's new tunnel, also capable of Mach 8-plus.

Tunnel operators believe they are "pushing" the instrumentation art. Yet instrumentation experts say the tunnels are not making proper use of existing systems.

The problem area appears to be in the speed and accuracy of data equipment, particularly as applied to the short run times of blowdown tunnels.

In the Autonetics system for North American's tunnel, information is collected from 144 sensing elements at 7,200 points per second. This system also is claimed to reduce the collected data for presentation in a half-hour.

Convair's system, designed by Consolidated Electrodynamics Corp., samples, digitalizes and stores 25 data channels at a rate of 800 data sets per second, or 1,500 per second when only one channel is used.

As an example of sampling equipment available, Wiancko Engineering's new high speed commutator is said to sample inputs for 10 to 100 pickups at rates up to 30,000 per second.

But here, too, a large-size controversy is raging. Some aerodynamicists are certain too much information is being gathered. They claim the need is not for more information and longer runs, but for important data and shorter runs. Several said it is "average" to reduce the requested datum points by one-third prior to actual tests.

Schlieren systems are making strong efforts to stay abreast of tunnel art.

The Task Corp., designer of Schlieren systems, has developed a multiple source system for operations through a windowless, perforated wall transonic section as well as a focusing system.

Task also is a good example of a company whose principal business is allied to the boom in windtunnel operations. Approximately 80% of its 1957 activity is in Schlieren systems, high cycle motors, internal strain gauge balances and assorted tunnel accessories. The company has sold more high cycle motors in the past year than in all previous years combined—mainly due to interest in VTOL and turboprop aircraft.

One major problem in the new

hypersonic (over Mach 5) tunnels is the duplication of high velocity and high temperature conditions. The Sandberg-Serrell Corp. has designed one possible solution for a Mach 10 tunnel now under consideration.

A pebble bed heater, containing 125 tons of alumina pebbles, would be used to heat the air prior to its use in the tunnel.

The alumina pebbles are heated to 2,800°F by a 30-million BTU per hour heater and air at 2,000 lbs. per square inch is sent around the pebbles and into the hypersonic nozzle.

What the future holds for wind-tunnels is difficult to predict, but it is generally agreed that several methods

are "on the fringe of development."

Shock tubes are in some favor. They are cheap to build, but offer instrumentation problems.

The "hot shot" approach may be another solution if nozzle erosion problems can be conquered.

Plasma jets are considered to have a good future if it can be determined just how to use them as windtunnels.

The gas gun is another promising path, if instrumentation problems can be solved.

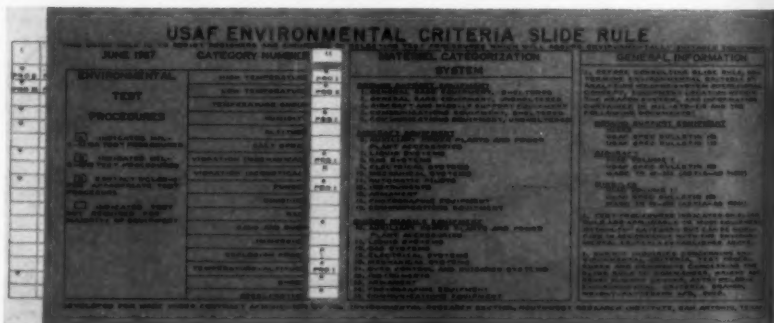
As controversial a subject as present tunnel art may be, there is little disagreement that the future will require tools and techniques that should be thought about today.

## Card slide rule helps engineers determine proper USAF test procedures

No longer is it necessary for designers and engineers to play "eenie, meenie, miney, mo" when they choose Air Force test procedures to determine environmentally suitable equipment.

A card-type slide rule, developed by Southwest Research Institute engineers for Wright Air Development

engineers based test procedures chiefly on the information in: (1) MIL-E-5272A, *General Specifications for Environmental Testing, Aeronautical and Associated Equipment*; and (2) MIL-E-4970, *General Specifications for Environmental Testing, Ground Support Equipment*.



Center, Air Research and Development Command, recommends test procedures and design ground rules for 25 categories of materiel. It's called the "USAF Environmental Criteria Slide Rule."

The slide rule divides equipment into three main groups of materiel: ground support, aircraft and missiles. Under each group are listed the various categories of materiel involved. Next, 17 different environmental conditions are given, such as temperature shock, humidity, altitude and acceleration. Thus the environmental condition can be paired on the slide rule with the materiel category.

If a designer wishes to know what test procedure to follow in order to check out "communications equipment, unsheltered" for a humid environment, he lines up these two variables on the slide rule and reads off the applicable military specification and test procedure to follow under this specification.

If no specification is given, an environmental test probably is not required.

Southwest Research Institute en-

Some environments that a weapon system may be exposed to, but whose effects are not completely known, are listed on the front face of the slide rule. Included are items such as meteorite dust, dissociation of gases and a moving earth's magnetic field.

Present and estimated environmental design criteria for aircraft, airborne equipment and missiles are given on the back of the slider. Here, ten environmental factors are related to design specifications.

Using the slide-rule technique to display a vast amount of environmental data limited the amount of detailed information that could be presented. For this reason, certain exceptions to the suggested test procedures had to be made.

Even so, WADC estimates that the slide rule is valid for at least 85% of the materiel included in each equipment category.

Copies of the slide rule and an explanatory report (ASTIA Document AD 118,296) can be obtained from ASTIA Document Service Center, Knott Building, Dayton 2, Ohio.

## First of a series

### What to look for when you buy business aircraft

by R. Dixon Speas and John J. Casey

WHEN A COMPANY buys a \$100,000 aircraft for business purposes, it must figure that over a 10-year life span of the plane it may well be making a long-range investment of as much as \$1 million. This would include expenditures for such items as fuel, maintenance and crew considerations.

Therefore, the matter of aircraft selection is of lasting importance and will determine the degree of success to be achieved by an operator of business planes.

A search for the "best" business aircraft requires a two-phase analysis. First, the nature of a business' requirement for aircraft operation must be examined. Each business will have its own requirements, just as surely as it has a distinctive nature in its basic business conduct and executive operation philosophies.

Furthermore, a business with a fleet operation may have such varied requirements that more than one type of aircraft may be necessary to meet its needs adequately and efficiently. A single-type fleet is unusual when more than three or four aircraft are involved.

Secondly, available aircraft must be examined for performance and cost characteristics. This examination should be made in accordance with the determined conditions of the first part of the two-phase analysis, rather than on the basis of a theoretical approach.

Flight times, operating payloads, operating costs and other comparison measures, when based upon flight distances, runway lengths and other actual operating conditions, are much more meaningful than maximum cruising speeds, maximum payloads and optimum operating costs.

These factors are considered important in establishing a business aircraft comparison basis:

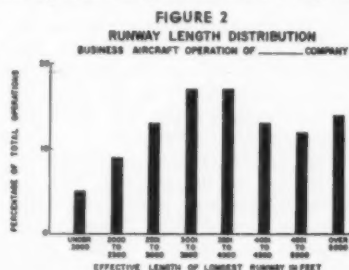
*Flight distance needs.*

*Runway length conditions.*

*Payload capacity requirements.*

*Capital expenditure limitations.*

In instances where a company has not previously operated business aircraft, it will be necessary to estimate an operations pattern to be expected.



This can best be done by making a forecast of the number of flights to be operated over each route expected to be flown.

The frequency of need as to various flight distances is an important determination for establishing a basis of measurement against which to compare the range characteristics of prospective aircraft. It is easy for an operator to make a guess as to his need, but a relatively small amount of time spent in making a sample flight distance analysis, (see Figure 1) is well worth while in taking the guesswork out of an equipment decision.

Such an analysis cannot be made without some relative importance attached to specific flight legs. For ex-

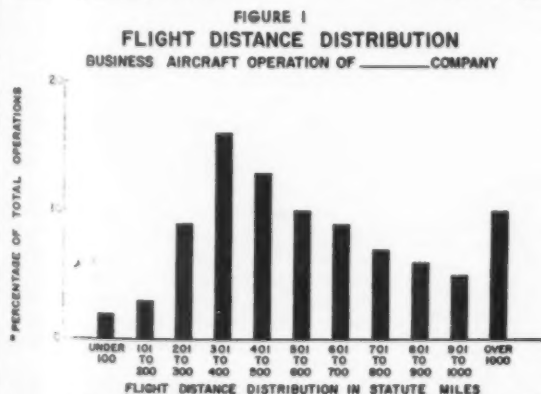
ample, an operator who has fewer than 5% of his flights extending beyond the flight range ability of a prospective aircraft may consider full nonstop capability of such importance as to rule out consideration of this aircraft.

On the other hand, an operator may not consider one refueling stop per 20 flights of major consequence and, because of investment or other performance reasons, he may choose to purchase the prospective airplane. It will be noted that the form of Figure 1 is proposed for two different plots. One is based upon number of flights, usually of most interest from the passenger-owner point of view, and the other is based upon total flight mileage—of interest from an operational view.

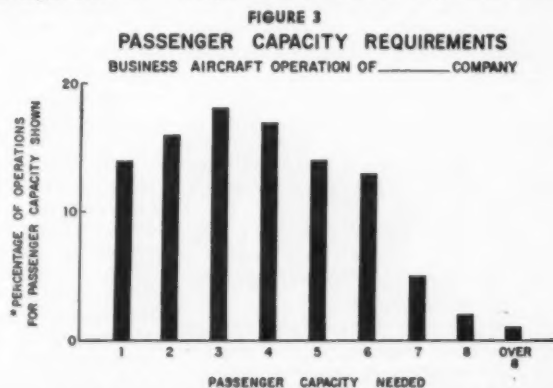
Although they are of primary concern in operating high-performance aircraft, runway lengths may or may not be important to an operator.

Figure 2 presents a means of presentation for general examination of runway length conditions to be anticipated—either based upon actual experience or flight pattern forecast. Such a plot is normally based upon total landings involved, although it might be prepared according to number of airports rather than number of total landings. Such a presentation allows an immediate determination of whether take-off and landing abilities of the airplane are going to be of primary concern.

The payload requirements of a business operator usually constitute a variable factor. For example, although there may be times when an operator would like to have an eight-passenger aircraft, he may settle for a six-passenger aircraft because of performance



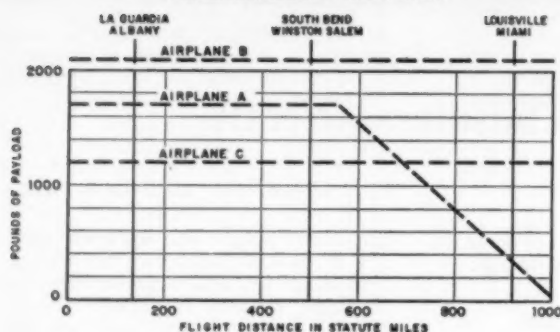
\* One plot should be drawn up on total flights and another on total miles.



\* This plot can be based upon number of flights or total miles flown.



FIGURE 4  
PAYLOAD ABILITY  
BUSINESS AIRCRAFT UNDER STUDY



considerations or capital investment limitations. On the other hand, an operator may need no more than six-passenger capacity on any normal operation. Yet he may buy an airplane capable of carrying more than 20 people. He obtains the added capacity in order to achieve the flight range, speed or some other performance or cost characteristics of the 20-passenger airplane. In any case, however, the capacity requirement should be examined for such limitations as are thereby involved.

A study of past experience in a business fleet operation can best serve the purpose. Where a business previously has not utilized executive aircraft, the study must consider size of groups traveling by such transportation means as have been used. The study can be utilized to establish a plot such as shown in Figure 3. This plot or these plots (according to whether based upon flights or total miles or one of each) can then be utilized in determining a reasonable capacity requirement.

A company will often have a fixed maximum amount that it will invest in an airplane or airplane fleet. In other instances, however, the nature of an airplane's capabilities will determine how much money a company is willing to invest in business aircraft. It is therefore well to have in mind the approximate amount a company is likely to invest before conducting a full analysis; but the final investment limitation should not be established until full measure can be made of the utility to the company of the aircraft under consideration.

Turning now from the analysis of the business operator's requirements to the performance abilities of the aircraft to be considered, we find the following factors to be conclusive measures for selection:

- (1) Range-payload ability.
- (2) Flight speed characteristics.
- (3) Passenger comfort facilities.
- (4) Operating costs.

Of the four factors, no one can be considered universally more important than another. A business operator may find any one of the four of determining importance to him according to his own specific operating re-

quirements. The most common situation, however, is a weighted consideration of all four factors for a judicious choice of aircraft.

#### Range-payload ability

In determining the payload an airplane can carry on a given flight, two initial decisions are of paramount importance: (1) What will be the aircraft's empty operating weight? (2) What will be the fuel reserve required?

The manufacturer establishes the basic weight of his airplane, but an operator decides how much in the way of interior furnishings, food, food equipment, instruments, radio, radar and other related equipment is added. In making an aircraft evaluation, an operator can make a simple weight analysis, starting with the guaranteed empty weight from the manufacturer and adding the weight of every item he expects to place on board up to fuel and payload.

Where an aircraft has an operational background, it is well to double-check weight experience with one or more current operators.

In the matter of fuel reserve, it is of utmost importance to take into account existing navigation and instrument landing facilities and limitations.

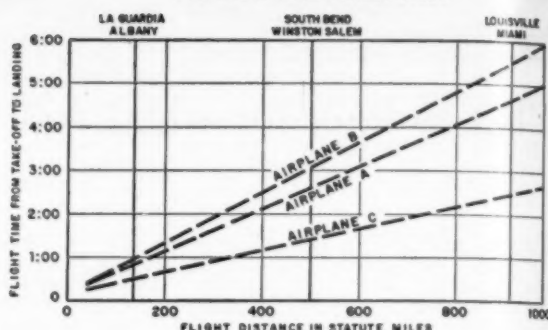
Fuel reserve is a personal matter with the pilot. Even in highly regulated airline operation, the final decision as to how much reserve is to be carried is left with the pilot.

Any analysis of range-payload ability of a business aircraft under study, therefore, should be preceded by

#### About the authors

R. Dixon Speas and John J. Casey, Jr., co-authors of this exclusive AMERICAN AVIATION series on business aircraft, are qualified pilots as well as engineers. As members of the New York consulting firm of R. Dixon Speas Associates, their specialization in the operational, economic and engineering phases of air transport makes them especially qualified on their topic. Next in this series, coming Feb. 10: How to select and train pilots for your business aircraft operation.

FIGURE 5  
FLIGHT TIME CHARACTERISTICS  
BUSINESS AIRCRAFT UNDER STUDY



a discussion of how much reserve fuel in terms of miles and minutes is going to be stipulated by the pilot in his operation of the airplane. In this manner, a practical fuel reserve value can be determined.

Once empty operating weight and fuel reserve weight is determined, it becomes a relatively simple matter to construct a payload-range curve such as shown by Figure 4. The weight range is shown in units of 200 lbs. because that is considered a normal unit weight for a passenger and his baggage.

Basic reason for aircraft utilization in business is to speed up transportation of personnel and/or cargo. Flight speed characteristics of each aircraft being analyzed should therefore be carefully evaluated. Rather than comparison of maximum cruising speed or other fixed and limited speed measures, it is considered desirable to work out flight plan examples of typical operations for the business under study. By means of climb and cruise flight analyses, a plot of flight times, such as shown in Figure 5, can be constructed. Flight times can then be tabulated for typical flight operations expected:

	Statute Miles	Airplane A	Airplane B	Airplane C
Boston-Buffalo	(394)	2:07	2:30	1:10
Atlanta-Buffalo	(716)	3:40	4:25	1:59
Atlanta-Birmingham	(134)	:50	:58	:29
Buffalo-Toronto	(68)	:30	:32	:20

Another table of comparison can be constructed by adding ground transportation times from originating business point to airport and from airport to destination point. Such a portal-to-portal comparison is often of direct value.

Passenger comfort is a somewhat intangible factor in analysis of aircraft for business operations. Personal opinion must be the deciding factor as to whether or not sufficient passenger comfort is available with a given combination of passenger cabin dimensions and appointments.

With higher-speed aircraft, there are more and more operations where additional time is spent going to and

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from airport than is spent en route. Under such circumstances, the comparison of airplane dimensions to those of automobiles becomes more realistic.

It is believed that the logical way to compare operating costs of business aircraft is on an annual or average monthly budget basis. The airline standards of cost per airplane-mile and per seat-mile are not really applicable to business operations.

A decision to buy a company airplane can rarely be made on a cost-saving basis compared to other forms of scheduled transportation. The development of a cost comparison on a per mile or a per seat-mile basis puts undue emphasis on the pure transportation function of business flying.

An annual budget basis gives a better means of comparing business aircraft operations, and it also is a more practical method of cost forecasting. Most of the major items as summarized below in a business operation are on a monthly or annual basis. Wide variations in aircraft utilization make any direct comparison between operations on a per mile or per seat-mile basis exceedingly variable and undependable.

### Monthly or annual budget

Aircraft depreciation .....	\$.....
Aircraft insurance .....	.....
Hangar rent or amortization .....	.....
Maintenance work force salaries .....	.....
Flight crew salaries .....	.....
Office staff salaries .....	.....
Contract maintenance costs .....	.....
Maintenance parts costs .....	.....
Fuel and oil costs .....	.....
Landing fees .....	.....
Weather service expense .....	.....

Total .....

Selection of the airplane with the lowest budget does not automatically follow. The fact that a company buys a business aircraft on other than a direct transportation comparison indicates reasons why performance must be considered of parallel importance to cost considerations.

It has been shown that many factors are involved in the logical choice of a business aircraft. Regardless of whether a company accomplishes its own analysis or engages a specialist for the task, it is of lasting importance that careful analyses be made of the operating task to be performed and the available aircraft to accomplish the task.

It is not that one airplane is basically better than another airplane, but rather that each airplane has its own performance capabilities and characteristics which make it specially suitable for special tasks. Many poorly matched business aircraft-flight task combinations exist and are still profitable for the respective companies. Such situations are a tribute to the broad margin of utility represented in business aircraft. Studied aircraft selection will result in more satisfaction to the business operator and more aircraft sales for the manufacturer.





## WEST COAST TALK

by Fred S. Hunter

### Why airlines can now fly DC-7 series at altitudes up to 28,000 feet

AIRLINES OPERATING DC-7 series aircraft can fly higher now, up to 28,000 feet. Previously, Douglas had licensed all three models—DC-7, DC-7B and DC-7C—for an operational altitude of 25,000 feet, specifying that any higher altitudes would be at the discretion of the pilot. CAA, however, ruled that operational altitude means maximum altitude. As a result Douglas has relicensed the aircraft for 28,000 feet, principally for the benefit of South American carriers who need to fly about as high as they can. The manufacturer probably will now take steps to obtain a like authorization from the CAA for the DC-6 series.

Hampden Wentworth, president of Longren Aircraft Co., makes the point that aircraft subcontractors, because of their smaller size and special skills, can produce many items 30% cheaper than the big prime contractors. But the trouble lies in the fact that government procurement policies actually penalize a prime who tries to accomplish such economies. The military will allow prime contractors a 6% or 7% rate of return on work they perform themselves, but only 2% or 2½% on work subcontracted out. So long as this policy exists, subcontractors will be subject to pull-backs whenever production volumes slacken. Right now work coming out for bids is down 65% to 70%.

Aircraft and powerplant engineers struggling with the jet engine noise problem have to take into account five factors: (1) noise suppression; (2) weight; (3) thrust loss; (4) increased drag; (5) associated reversers. It ain't simple. You add to the complications when you work on making your noise suppressors retractable as they are doing at Douglas. You may have noted, incidentally, that the jet transport manufacturers are careful not to refer to noise suppressors as silencers. Capt. Eddie Rickenbacker laid down the law on this. "They can't be silent so they shouldn't be called silencers," Capt. Eddie declared.

The airlines aren't alone in their "no show" problems. After experiencing 63 "no shows" out of 251 reservations for a dinner meeting, the Los Angeles section of the Institute of the Aeronautical Sciences notified all members that hereafter payment will be re-

quired for all future dinner reservations which are not cancelled by 10 a.m. on the day preceding the meeting. The caterer's guarantee for dinners at the IAS is \$2.50 per copy and the L.A. section's bank account was taking a beating.

North American Aviation can change over from General Electric's J85 to Fairchild's J83 in its UTX twin-jet utility trainer by redesign of engine trunnion mounting and nacelle lines. But this would entail a completely redesigned installation, so Fairchild's chances of making a sale here are not too good.

Douglas continues to talk to carriers about the DC-7D cargo airplane, but continues to run up against the financial wall . . . The Navy is now training fleet squadrons in atomic weapons delivery techniques at three instrumented ranges on the west coast, China Lake and El Centro, Calif. and Fallon, Nev. . . . President Ed Converse estimates Bonanza Air Lines will be able to phase out all DC-3s by 1961, replacing them with Fokker F-27s . . . Pan American landed a contract to carry newspapers from Britain via the Polar route to British forces stationed on Christmas Island in the Pacific.

Any expansion now taking place in the aircraft, missile or electronic fields in Southern California is mostly in Orange County or in San Diego. Land values and taxes have become too high in Los Angeles County.

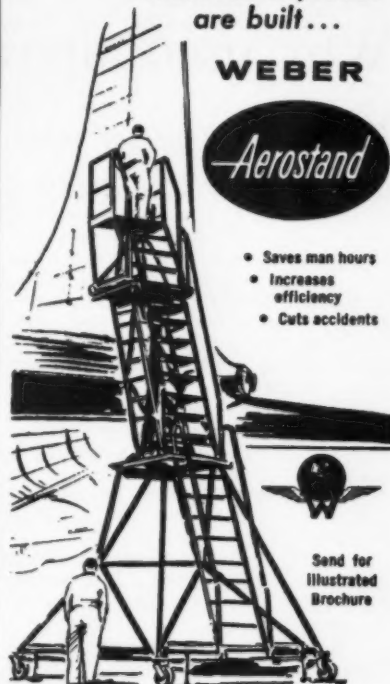
Example of the need of a long bankroll to bring out a jet transport: Windtunnel costs on the Douglas DC-8 amounted to \$7 million.

United Air Lines will run tests on Aerojet-General's infrared proximity warning indicator installed in the top of the tail of its Mainliner O'Connor in which it also will try out a public telephone system . . . Convair President Joseph T. McNarney, who did not retire—as advertised last year—may do so this spring, but would remain as a consultant . . . North American still has possession of one of the three F-107s it built but will soon turn it over to NACA, which already has one. The third one is at Wright-Patterson for the museum.

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## Why used aircraft market is sagging

*Potential buyers of piston aircraft grow scarcer as major airlines await arrival of turboprops and jets*

by Donald J. Frederick

A SCARCITY OF BUYERS has depressed prices in the used aircraft market. With the softening of this once strong market, future prospects do not appear bright.

For example, where a DC-6 sold on the used plane market last year for \$1.4 million, the current price range has slipped to about \$1.3 million.

American Airlines has experienced difficulty in disposing of five new DC-7s at factory price.

Constellation equipment which was considered a bargain at \$950,000 in 1955 is today finding difficulty in the \$800,000 range.

Smaller equipment is faring no better.

One airline purchased seven Convair 240s for a package price of \$3,320,000 in 1956. But in 1957, American Airlines was forced to offer its Convairs at \$375,000 each—fly away delivery. Cruzeiro do Sul, the Brazilian carrier, is buying ten of these aircraft, but details of the transaction are not available.

The durable DC-3, according to

William C. Wold Associates, specialists in the sale of used aircraft, can now be obtained in the \$100,000-\$125,000 price range. Wright powered DC-3s run somewhat lower. Yet during the early part of 1957, transactions in higher figures were not unusual.

As late as 1956, one carrier reported an estimated sale price on a DC-4 at \$550,000. By August of the same year, one airline official in charge of the sale of DC-4 aircraft estimated that his carrier would be lucky to get \$250,000 apiece for these planes considering the discounts being offered for flight time and airframe overhaul.

Doubt now seems to surround the possibility of much-needed cash generation from the sale of these piston engine aircraft. In fact, the future market for the DC-6, DC-6B and DC-7, and the Constellation appears at best questionable. Problems of size confront these aircraft which cannot get in and out of many of the airports where local service carriers, business concerns and individuals need to use them. Even if the aircraft were economical to op-

erate, these owner groups would probably offer considerable sales resistance.

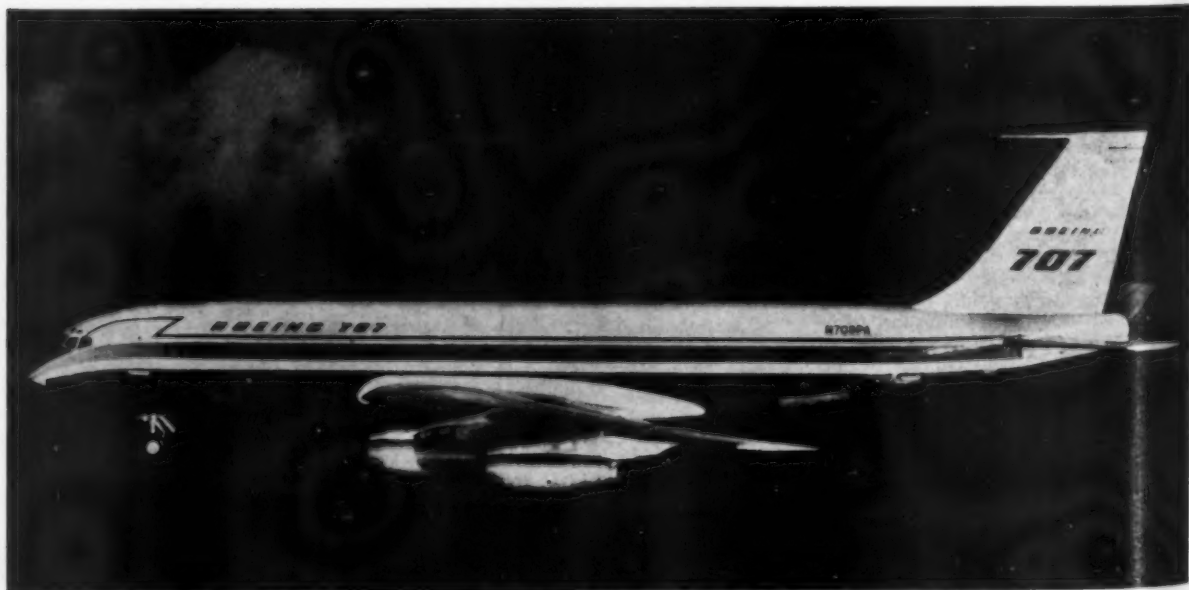
Thus, with most of the major airlines having jets and turboprops on order, the nonskeds and the all-cargo carriers seem to be the best bet. But the bet appears to be a poor one.

Ranks of the nonskeds have thinned in recent months and others, better established, are acquiring new planes from the manufacturers.

The cargo lines have their own headaches. The emphasis here is not on speed but on economy. For this reason, a DC-7, for example, may be unattractive as long as any DC-6s are available. Further, the average passenger aircraft is not suitable for cargo operations unless expensive changes are made. The cargo companies, which are not buying new planes designed specifically for cargo use, may be searching for surplus military cargo aircraft.

Looking at the complete picture, the number of aircraft operated by nonskeds and cargo operators is minute compared to the number of planes now

*First production 707 makes maiden hop of seven minutes*



AMERICA'S FIRST production jet transport made its initial flight Dec. 20 from Renton Municipal Airport to Boeing Field, Seattle. The seven-minute flight was made in a driving rainstorm. Multitube noise suppressors are attached to each engine.

## Current estimated prices of used aircraft

AIRCRAFT	PRICE RANGE (in thousands) (market inactive)
B-377	
Convair	
240	\$ 450-500
340	500-600
Douglas	
DC-3	100-150
DC-4	500-600
DC-6	1,250-1,500
DC-6B	1,500-2,000
DC-7 & 7B	2,357-2,500
Lockheed	
L-049	800-1,000
L-649	1,200-(approx.)
L-749	1,300-(approx.)
Martin	
M-202	350-(approx.)
M-404	500-600

in scheduled operation. And even if these two sources were to increase their equipment demands, it would make only a minor dent in the total supply of used equipment.

Another possibility is the foreign carrier. But major foreign airlines all over the world have placed their own orders for jets and turboprops. They too will be looking for buyers. And the foreign equivalent of the local service carrier will hardly be interested in any large quantity of DC-6s, Constellations or DC-7s.

During the early 1950s, airlines wishing to dispose of DC-3 equipment found themselves in a favorable position because: (1) manufacture of the DC-3 had been discontinued; (2) no replacement was in sight at the time and (3) the DC-3, although not ideal for local service carriers, business firms and individuals, was the best plane then available.

With the advent of the jet age, the days of the reliable DC-3 appear to be numbered. Already several of the local service lines in this country have on order DC-3 replacements such as the new turboprop F-27; to mention a few, Bonanza Air Lines, Southwest Airways, Piedmont Aviation and Frontier Airlines.

Prospects for older Convair and Martin equipment do not appear any brighter. Many of the domestic trunklines are replacing their Convairs (and Martins) with turboprops.

Wold Associates contends that with a gradual drift downward in pricing, buying interest is again picking up. The organization points out that in the past few months five DC-4s have been sold—the last of which was a convertible cargo-passenger DC-4E sold to the British Independent, Independent Air Travel.

Meanwhile, leasing activity continues at a lively pace. Civil Aeronautics Board has just approved an agreement under which Resort Airlines will

lease two Lockheed Model 1049-Hs to Hughes Tool Co., principal stockholder in Trans World Airlines. Lease would be through April 30, 1958. Terms of the lease reveal that the 96-seat Conquies would be rented to Hughes for \$40,000 per month per aircraft, plus certain rental charges for spares.

An agreement between Eastern Air Lines and Trans American Airlines earlier this spring involved seven DC-6Bs. The first five planes are to be leased to Eastern for five years, the remaining two for four years. An option to EAL permits a single extended lease term of from 12 to 36

months, provided all seven aircraft are included in such extension.

Rental terms to EAL are \$32,500 per airplane per month, or slightly under \$13 million.

Six Constellations changed hands in another lease agreement contracted during the latter part of 1956 between Trans World Airlines and EAL. The planes have an 81-seat configuration. Rental for the aircraft was calculated at \$1.40 per mile for the number of miles flown under EAL colors, or \$3,080 per day times the number of days the plane is on lease. The planes were operated until May 1957.

## CAB clamp-down on passes for airline employees may bring new wage demands

After threatening to do so for four and a half years, the Civil Aeronautics Board on Jan. 1 enforced new rules sharply curtailing pass privileges extended to airline employees. Besides being extremely unpopular with the employees, the move may prove costly to the airlines in general.

Basically, the new rules as stated by CAB amount to "law" and must be observed. But in another sense, the rules are actually CAB's interpretation of the law; in short, what CAB considers the terms "employee" and "immediate family" to embrace. And CAB's interpretation differs sharply from what airlines and their employees believe and have become accustomed to over the 19 years of Federal regulation.

The disputed rules do not go to the amount of free or reduced-fare travel a given employee may enjoy but rather cut into the number of people to whom pass privileges have been extended in the past. Briefly stated, free transportation may be granted to an employee and members of his immediate family residing with him and dependent upon him for support. In virtually all other respects, such privileges have been disallowed by the Board.

When it is considered that the free travel involved is on a "space available" basis, many results of the tight CAB policy border on the ridiculous.

For example, if management wants to interview a prospective employee who resides in another city, it no longer can permit him to utilize one of the empty seats on one of its planes to bring him to the home office. Instead, management must reimburse the person for occupying the same seat he would have used in the first place.

Or if the attorney retained by an airline is called on to visit the home base of the line, he can properly bill the airline for the cost of transportation which the airline formerly could give him free. Same with officials and

employees of the advertising firm representing a company.

In short, CAB's new interpretation of the Act has added a seemingly unnecessary cost of doing business at a time when airlines are plagued with rising costs.

It also will be interesting to discover how CAB's mail rate section will greet the added costs on the books of subsidized carriers such as the local service industry.

Airline employees have a different gripe but one that also could be reflected as an added cost. Previously, close relatives such as parents, could receive free or reduced-fare travel on a space-available basis whether or not dependent upon the employee. Now the parents, etc. must both reside with and be dependent upon the employee for the special privilege.

Pensioned or retired employees are no longer eligible nor are members of the immediate family of a person injured or killed in an accident.

To the employee this is an apparent cutback in the benefits of his job and it is virtually certain to be reflected in future labor-management negotiations. Higher wages are the obvious potential result.

It is significant that CAB first acted to change the rules back on June 30, 1953, a period when the domestic trunk industry was just breaking through the barriers to self-sufficiency.

When the industry was on subsidy, the tight pass rules would have increased costs and, accordingly, subsidy requirements. Now the trunks are subsidy free and the cost of the new rules can be borne by the stockholders.

No one doubts CAB's responsibility for carrying out the mandate of the Act in restricting pass privileges. But after 19 years, some of the new rules appear a bit far-fetched, particularly when the industry is fighting to keep its head above water and is faced with a rash of labor problems for 1958.



# Punched cards cut paperwork in UAL maintenance

by Joseph S. Murphy

UNITED AIR LINES maintenance officials have devised a new combination of advanced punched-card accounting and visual scheduling methods to "maximize" the production time actually devoted to scheduled work at the airline's San Francisco "push-button" maintenance base.

New methods introduced by UAL, principally involving the use of machine accounting in the scheduling phases of overhaul work, have made it possible for United to handle paperwork phases of its program at about one-third the former cost.

Today the airline operates some 190 aircraft of almost a dozen different makes or specialized models. Anywhere from 25 to 30 are scheduled for some portion of a "progressive" overhaul every month.

The DC-6 alone accounts for three types—the DC-6 tourist, DC-6A cargo version and DC-6B Mainliner—all requiring special variations in overhaul schedules to suit their peculiar characteristics.

Until recently, United planned the workload for the various aircraft, reproduced work tickets and stock requisitions from files of master stencils and fed into these files as many as 2,000 changes, corrections or modifications to these overhaul procedures a month. To further complicate the paperwork problem, United's basic 12,000-hr. overhaul cycle is spread over six 2,000-hr. visits to the base, in order

to efficiently man work assignments and avoid "peaks and valleys" in manpower.

As its answer to this complexity, UAL has transferred the master job instructions that govern its entire progressive maintenance program to punched cards. The files used to control regularly-scheduled work on its fleet are now represented by some 100,000 IBM cards. The three models of DC-6s alone account for 30,000 of these.

Using the IBM 407 accounting machine in conjunction with this card file, United now has the ability to select automatically and print work assignments for a given airplane visit by simply wiring the program board of the 407.

Here's how the process works:

At least two weeks before an aircraft is due in overhaul, it is scheduled for a specific dock location and listed on the master work schedule for the base. This serves as authorization for the punched-card accounting section to prepare job tickets and stock requisitions which will control the overhaul.

When preparing the master decks, UAL codes the cards, indicating to which overhaul cycle the various functions or materials apply. Then, for example, when a DC-6B is scheduled for No. 5 overhaul, the 407 is wired to read the designation codes for this plane and cycle.

All 30,000 cards in the DC-6 file are then put through the 407 without

need for preselection or sorting. The machine "reads" cards at the rate of about 9,000 an hour, and prints only the job tickets or stores requisitions that apply.

Depending on the nature of the overhaul and the airplane type, as many as 1,000 separate job cards may be needed for a single base visit. These are written by the 407 on continuous, marginally-punched forms, each covering one job.

The job cards include directions minutely spelling out each step of each operation and contain the standard work hour figure at which United's industrial engineers rate the job. Planned hours are also marked off by means of an asterisk imprinted on a ruled scale at the bottom of the form.

The asterisks serve as guides for production schedulers, who insert the cards into Remington Rand Sched U-Graph visual schedule boards used in actual shop work planning. Since these job cards are the actual work orders to be used on the service lines, the supplier, The Standard Register Co. of Dayton, O., prints them on grease-resistant cleanser stock to withstand the inevitable wear as they are handled and signed by mechanics and inspectors.

Actual link between the machine-printed job tickets and a smoothly running overhaul shop, of course, lies in production control. This section receives job tickets from the punched-card accounting unit and is charged with arranging them in the visual schedule boards from which maintenance line supervisors will issue job cards to the mechanics.

To start with, all tickets connected with a given overhaul must be carefully audited against a master list to be sure that specifications are being met. Then, any special modification or checking assignments not included in the regular overhaul routine are set up on handwritten job cards and inserted in their proper sequence.

Finally, all cards for a given overhaul are broken down according to trades or skills and loaded into the visible-edged pockets of the scheduling boards. In this work, time is allotted according to the asterisk imprint on the ruled time scale. Thus, at least a week before a plane is due into the Maintenance Base, supervisors know exactly what their man-hour requirements for each job classification will be.

Their planning is done to the letter of the schedule, with the accounting department running a continuing audit to determine just how good the planned times and workloading procedures really are.

Planning for parts and material requirements needed in each overhaul is carried out similarly. In this case, the



AUTOMATIC SELECTION and printing of overhaul job cards is handled by this IBM 407 accounting machine that automatically stacks job cards. Punched cards are monitored on opposite side by UAL machine operator Henry Jackson.

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U.A.L. JOB CARD		PLANE NO.	COST CLASS
EMPENNAGE - STRIP		AR 25	4 8 130101
1. OPEN INSPECTION PLATES - PER CLEARANCE CARDS			3-RIG
2. CHECK ALL HORIZONTAL & VERTICAL STABILIZER SHROUDS FOR PROPER FAIRING TO ELEVATORS & RUDDER - PER S-8-6-3-3. HAVE INSPECTION MAKE WRITE UPS TO CORRECT STATIONS OUT OF TOLERANCE.			
3. OPEN TOP AND BOTTOM R H ELEV SHROUDS.			
4. OPEN TOP AND BOTTOM L H ELEV SHROUDS.			
5. OPEN RUDDER SHROUD.			
6. CLIP STRING TIES ON SHROUDS OVER L H ELEV TAB RODS.			
7. CLIP STRING TIES ON SHROUDS OVER R H ELEV TAB RODS.			
CAUTION - SAFETY GOGGLES MUST BE WORN DURING ALL STRIPPING OF AIRPLANE			
RL 11-22-55			
ALL			
EMPENNAGE - STRIP		AR 25	4 8 130101

TYPICAL JOB CARD contains complete instructions including safety precautions.

407, also selecting cards according to program, imprints a list of required materials for the guidance of the storekeeper. This list serves as his authorization to assemble the needed supplies and have them waiting when a plane arrives at its scheduled dock.

In both cases, with labor and materials, punched card follow-ups serve to give United a running and highly accurate audit of its operations.

In the case of man-hour scheduling, the controls are tied in with a very essential punched card payroll application. All time worked in UAL shops is recorded on prepunched attendance time cards. After the attendance time cards are approved by the responsible foreman, they are audited by payroll accounting and transmitted to machine accounting for accumulation and payroll preparation. Time worked per attendance cards and time distributed per job cards can then be compared.

After the labor distribution cards are punched, they are automatically matched with master job cards and information is punched into the labor distribution deck covering standard hours and pay rates for each job. Then, at the rate of thousands of computations a minute, an IBM 604 electronic calculator multiplies the hours worked by the average rate to develop detailed operating cost figures.

At the completion of each overhaul the labor distribution cards are run through an IBM accounting machine to produce a detailed working analysis. Among other things, these reports present a job-for-job comparison between the actual hours it took to complete the work and United's current standard for each assignment. This, of course, provides a continuing audit of the efficiency both of shop labor and of the airlines' work scheduling accuracy.

## CRAF program for 1960 to include jets if CAB approves agreements with airlines

Department of Justice has given a green light to the government's Civil Reserve Air Fleet (CRAF) program provided the Civil Aeronautics Board approves the various agreements involving air carrier members of CRAF.

The Justice ruling was part of a double-barreled development aimed at priming the airline industry's commercial air fleet for national emergency use. Just prior to the legal ruling, a firm CRAF program for fiscal 1959 was determined in which 309 four-engined aircraft were earmarked for mobilization on 48 hours' notice in the event of a national crisis.

Also significant in the CRAF program announcement were tentative plans for fiscal 1960 in which, for the first time, civil jet aircraft would be assigned for war use.

The Justice Department's legal

ruling, issued by Attorney General William P. Rogers was sought last August by Secretary of the Air Force James H. Douglas and Defense Air Transportation Administrator Theodore Hardeen, Jr.

Need for the ruling was described by Douglas and Hardeen this way: "Much of CRAF planning is to be done by industry groups to be called 'Operations Boards' which are made up by representative employees of member airlines. A proposed Operations Boards Agreement has been drafted, but due to the belief by some that this agreement may have anti-trust implications, the airlines to date have shown reluctance to sign the agreement draft."

The Attorney General held, however, that under appropriate sections of the Civil Aeronautics Act the CAB has the legal authority to review this

Operations Boards Agreement and approve it, thereby affording anti-trust immunity to the carriers to the extent provided in the Civil Aeronautics Act.

The Operations Boards are designed to function as planning boards in time of peace but would assume active responsibilities for service of the commercial planes involved in time of war. Initially, Boards for the Atlantic and Pacific areas are contemplated.

Meanwhile, 24 air carriers are committed to furnish aircraft for the 1959 CRAF program. Carriers and the number of aircraft each will furnish are: Alaska, 4; American, 38; Braniff, 7; California Eastern, 4; Delta, 10; Eastern, 28; Flying Tiger, 14; Great Lakes, 3; National, 2; Northwest, 29; Overseas National, 4; Pacific Northern, 2; Panagra, 2.

Also, Pan American, 39; Resort, 9; Riddle, 5; Seaboard & Western, 16; Slick, 12; S.S.W., Inc., 4; Trans Caribbean, 4; Transocean, 7; Trans World, 26; United, 27; and U.S. Overseas, 13.

Included in the program are 85 DC-4s, 74 DC-7s and DC-7Bs, 46 DC-6As, 34 DC-7Cs, 33 Lockheed 1049Hs, 25 Lockheed 1649As and 12 DC-6Bs. In fiscal 1960, tentative plans call for adjustment of the totals, most notable feature being inclusion of 16 Boeing 707 jet transports.

## Smith urges clear policy by U.S. on subsidies

American Airlines' president C. R. Smith said recently that the airlines urgently need a fare increase but the domestic trunk carriers should be required to operate without government subsidy. He urged a "clear policy" by the government on the subsidy issue.

Speaking in New York at the Transportation Investment Forum for Insurance Company Executives, Smith said subsidy "should not be used as a means for removing the normal managerial risks associated with a business enterprise."

"Nor should it be used as a substitute for timely and effective regulatory action by the government," he added.

Smith said the government should preserve the ability to subsidize carriers engaged in overseas commerce and in local service operation "when it is proven to be in the public interest to do so." But, he added, "federal financial assistance should be provided only where there is a clear-cut need for such to accomplish some objective in the public interest—an objective that could not otherwise be adequately realized."

The AA head hit particularly at subsidized competition. "Competition which is financed with federal fund," he said, "is unlikely to be fair; indeed it cannot be fair, for certainly the resources of the federal government will outbalance any resources available to an individual carrier."



# First guaranteed loan moves through CAB mill

by Gerald A. Fitzgerald

**THE RAPID TRANSITION** by CAB's Bureau of Air Operations into the guaranteed-loan business has made it possible for the first application for relief under the terms of the recently enacted equipment loan guarantee bill to begin to receive processing.

Alaska Airlines has applied for CAB guarantee of a \$3-million loan to buy two DC-6s: one new aircraft from Douglas; the other, used, from Slick Airways. Making the loan is the Seattle First National Bank and the request is for the maximum, 90% guarantee.

Expected also in the near future are applications from at least six other eligible carriers whose names were not disclosed, but who are negotiating for loans and who will undoubtedly apply for the guarantees provided for in the act.

Purpose of the act was to provide relief for local service, territorial and helicopter lines. Their inability to replace worn and outmoded equipment was preventing them from improving service to meet competition and making impossible their attempt to reduce subsidy requirements.

Thus, the act helps to make re-equipment funds available to the 28 eligible carriers where funds were not available at reasonable terms and where the re-equipment program will improve the service of the carrier concerned.

Translating the terms of the act, however, into practical administrative language and getting the program off to a rapid start was a considerable job. Credit for this must go to Bureau Director Joseph Fitzgerald's special assistant Sam I. Aldock and his staff.

Aldock has been assisted in this program by I. W. Sirbaugh and Seymour Wenner, CAB staff attorney.

Although the program was activated almost immediately after the President's approval of the bill, four major questions had to be resolved before it could be administered effectively.

First, since the Board was given the authority to operate this program, it had to decide how it was to operate. It did not wish to prescribe interest rates for two reasons: (1) Experience of other guaranteed-loan programs showed that too often the maximum interest rates set soon became minimum rates; and (2) interest rates set without regard to market fluctuation soon became obsolete.

Therefore, since the applicants were limited to only 28, it was decided not to prescribe a rate, but to judge each case on its merits.

Another question that Aldock and his staff faced in setting up the program was what sort of a guarantee could the Board make. Two types of guarantees are common:

*One guarantees the lender* against ultimate loss, but places the burden of foreclosure in the case of default upon the lender. To most lending institutions this is a very unsatisfactory arrangement and many refuse to consider loans under this type guarantee.

*The other, which leaves the guaranteeing authority with more control and seems preferable in this case, forces the lender to seek relief only from the loan guarantor and places the burden of remedy on the authority.* The Board favors the latter since it falls more closely within the terms of the act and generally is more com-

patible with the terms and intentions of the Civil Aeronautics Act.

A third difficulty was the setting up of guarantee fees to be applied against the interest of the banks and lending institutions involved. A scale of fees was arrived at by relating them to the interest rates charged; the percent of guarantee requested; and the length of the loan.

Finally, a standard application form was required.

Theoretically, application would be made only when the carrier had arranged for the needed financial backing; nor would the Board know anything of the application until it had been formally submitted.

Questions arose as to what was the best way to submit the application and what items were covered under the guarantee as the law was written.

These questions and others required that the carriers and the staff work more closely together than is customary. As it stands now, there is a standard application form that spells out pretty clearly what is required of the applicant carrier. The staff continues to be available for consultation and advice.

Although it is still a matter for conjecture as to which carriers will ask for the loan guarantee, a look at this latest breakdown of orders for the Fairchild F-27 might give some indication: West Coast, 6; Northern Consolidated, 3; Wein-Alaska, 3; Piedmont, 12; Bonanza, 3; Mackey, 2; Southwest, 3, and Frontier, 2.

Fairchild reports 62 firm orders and 22 options for the F-27. Included among these, however, are foreign orders and orders for industrial or executive-type aircraft.

## First Continental Viscount starts certification trials



CONTINENTAL AIRLINES' first Vickers Viscount 810 is shown at rollout. This 365-mph version is powered by 2,100-eshp Rolls-Royce Darts. More powerful Dart 541 will be fitted later to raise cruise speed to 400 mph. First delivery is scheduled for March. Continental has 15 Viscount 810s on order.



SPACIOUS LINES of Douglas DC-8 interior accentuate the uncluttered overhead design. Wide aisles, wide seats and wide, high overhead arches provide more room, more comfort and more luxury for all in upcoming jet transport, Douglas designers say.

## Douglas reveals interior layout of its DC-8 jets

by Fred S. Hunter

FOR HOURS ON END, 67 representatives of the 14 airlines buying DC-8 jet airliners studied and re-studied, examined and re-examined the prototype seats Douglas Aircraft Co. had installed in two fuselage mockups in its Santa Monica, Calif., hangar.

This was the four-day conference to resolve seating standards for the new jet. From now on any changes an airline may wish to make in the apparatus in which it will deposit its passengers comes under the heading of "optional" equipment—in other words at the customer's expense.

Seating is one place in which an airline can project its own individuality and perhaps offer something more attractive than its competitors. As Ivar Shogrun, chief project engineer on the DC-8, observed: "In 20 years in the powerplant section I used to think engines were pretty important, but now I'm discovering that engines and wings are really just adjuncts to the seats."

Unlike other transport manufacturers, who design their seat installations but farm out the actual manu-

facture of the chairs, Douglas produces its own seats. Airlines are not obligated to buy them. An allowance on the purchase price is provided if a buyer prefers to go to a seat specialist. Douglas has turned out more than 15,000 seats for DC-6 and DC-7 aircraft.

For the DC-8, Douglas has developed a new concept which it calls "Unit-ized Seating." This is an arrangement that makes each reclining chair a self-sufficient unit for the comfort and convenience of the passenger. The Douglas name for the chair is "Skyloge."

For the passenger, an outstanding feature of this new concept is the elimination of the overhead utilities. Everything—reading lamp, cold air outlet, oxygen masks, stewardess call button, built-in folding table—is located in the seat.

For the airline, new flexibility permits rapid changes to meet fluctuating passenger load requirements. Chairs and compartment bulkheads are attached to tracks and may be moved or removed in a matter of minutes. All

utility connections are provided through a single, quick-disconnect plug.

Douglas describes the "Unit-ized Seat" as embodying the thin sheet-metal design philosophy that is recognized by modern aircraft designers. By correct application of sheet metal in the form of monocoque structural members and closed torque box members in the seat back and bottom structures, Douglas has come up with a 12G seat, including the utilities installed within it, weighing less than specified by some of the airlines without the utilities installed.

Douglas DC-8 seats include the five-abreast first-class seat with three-place units on the left side of the cabin and two-place units on the right side; the six-abreast coach seat, which is basically the same as the first-class seat but is slightly narrower and has less downward back slope of the seat bottom, and the slumber seat, which is a converted five-abreast first-class seat that reclines to 62 degrees and is designed for 54-inch space between seat rows. The six-abreast coach seat design would permit 34-inch spacing.

OVER-THE-SHOULDER reading light on each seat directs diffused eye-level beam from sheltered head-rest position. Illumination is not interrupted by movement of other passengers.



LOUNGING passengers in three-abreast configuration enjoy seats as wide as any two-abreast first class configuration used in any of today's transport aircraft.



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## TRANSPORT TRENDS

**Some high CAB officials reportedly are in favor** of finding a separate method of dealing on an emergency basis with airline requests for a fare increase. If CAB were to authorize a fare hike in the near future, it would be tied to an expiration date coinciding with decision in the General Fare Investigation.

*This investigation, incidentally, is now expected to run until summer. The rate-of-return phase will last well into February and thus take all the time originally estimated for the entire hearings. Next come sessions dealing with the airlines' five-year forecasts. Third and final part will be the catch-all phase.*

**A three months' moratorium on Viscount payments has been granted** Capital Airlines by British financial interests. Payments, which total about \$1 million monthly for principal and interest, will not be made during the January-March period. Moratorium will help Capital's serious financial condition.

**Although most transatlantic airlines will offer** four classes of service this summer—deluxe, first, tourist and economy—there's some doubt in the industry that tourist class will continue to be available much beyond 1959. Economy class is likely to be selected by most passengers who formerly rode tourist.

**Attempt is under way to clarify the role to be played** by the Air Coordinating Committee, now that Airways Modernization Board is beginning to act on air traffic control facilities problems. First item at hand is to resolve status of ACC's Nav Panel. AMB is reported to be seeking authority for direct handling of aviation user requirements to avoid time-consuming committee actions. ACC, however, is said to favor keeping some, if not all, of its past coordinating powers in such matters.

**A date to remember: Feb. 1 is the deadline** set by Bureau of the Budget director Percival Brundage for government agencies to submit to him legislative proposals "to establish an equitable and uniform government-wide policy on charges and fees for certain government services and property." By that date, Commerce Department is expected to submit its plan for airways user charges. Also, fees for certificates of convenience and necessity, airman's certificates, etc., may be proposed.

**Qantas Empire Airways has decided to buy five Lockheed Electras** and is now in the process of getting Australian government permission for the dollar expenditure. Qantas also plans to increase its Boeing 707 order.

**Out of 4,315,483 passengers between U.S. and noncontiguous foreign nations** in year ended June 30, 1957, 70.7% traveled by air, 29.3% by sea, according to analysis of Immigration and Naturalization Service figures. Not included in statistics are cruise travelers, military personnel or border crossers. Air showed 15.5% gain over previous year, sea 1.7%.

**Substantial orders are expected for big turbine-powered transport helicopters**, once specifications and cost data are in final form for craft now in the development stage. Several airlines in South America and Africa believe that the turbine will make the rotorcraft a very useful addition to their fleets.

**Whichever medium-range jet transport British European Airways decides to buy**, production is likely to be shared by several of the major British companies. If the DH.121 wins out, Handley Page, Fairey, Hunting, Saunders-Roe and Bristol will cooperate with de Havilland. If the Bristol 200 or the Avro 740 is chosen, manufacturing work will be shared by the Hawker Siddeley group of companies and Bristol. BEA will order about 20 planes. Powerplant will be a scaled-down version of the Rolls-Royce Conway.

## TRANSPORT At Deadline

### Republic Rainbow turboprop transport project resembles enlarged Viscount, carries 80 passengers

Details of Republic Aviation Corp.'s Rainbow turboprop, a four-engine transport project, have been disclosed in a market research brochure sent to most of the world's airlines by Robert Hewitt Associates, Inc. on behalf of Republic. No other formal announcement has been made by the company.

Externally the Rainbow looks very much like an enlarged Viscount. It even has the same type of window as the Vickers transport. Powerplant of the four-engine aircraft can be either the Rolls-Royce Dart RDa 10 or the General Electric T64 (both 2,600-EHP engines).

Maximum payload is the same for both powerplants—19,200 lbs. Payload with maximum fuel is 17,620 lbs. while fuel with maximum payload is 15,420 lbs. The Rainbow accommodates up to 80 passengers.

One of the Rainbow's features of great interest to airlines is the takeoff and landing performance. Mainly due to the use of leading-edge slats, the Rainbow's standard-day field length requirement for takeoff at 77,500 lbs. gross weight is only 3,160 ft. CAR landing field length at 74,000 lbs. gross is 4,000 ft.

The Rainbow is 87 ft. long and 29 ft. 6 in. high. Wing span is 112 ft. and wing area 1,150 sq. ft. Wing loading is about 67 lbs. per sq. ft.

The Rainbow will cruise at slightly more than 400 mph at maximum cruise power, yet its maximum stalling speed is only 89 mph. The aircraft's range

with reserves at maximum continuous cruise power is about 2,000 miles with T64 or 1,500 miles with the Dart. At maximum economical cruising power with reserves their respective ranges are 2,500 and 1,700 miles.

The direct operating cost of the Rainbow is about \$1 per aircraft mile for stage distances of around 1,000 miles. It is slightly more expensive to operate than the Viscount 700 and slightly less expensive than the Caravelle, according to Republic's computations. On a seat-mile basis the Rainbow comes out very well—\$0.014 for a stage distance of 500 miles, down to just over \$0.011 at 1,500 miles. The Rainbow is priced at about \$1,800,000.

### 'Realistic scheduling' rule unrealistic, airlines say

The U.S. scheduled airline industry has asked the Civil Aeronautics Board to reconsider and repeal or modify the so-called "realistic scheduling" regulation which went into effect last Sept. 20.

Air Transport Assn., representing the industry jointly, and American Airlines, acting independently, filed simultaneous requests.

At issue is Part 234 of CAB's Economic Regulations which makes it a criminal offense if a carrier fails to meet its published schedules within 15 minutes of actual time with 75% of the flights operated. American termed the rule "unworkable" and "unnecessary."

ATA said it is "not a legally valid regulation."

The airlines have been considering an industry agreement to govern scheduling practices. But American said such an agreement would serve no purpose unless the CAB regulation is withdrawn.

American insisted the government cannot regulate "performance" but can deal only with "prediction of performance." "If a carrier in good faith publishes a schedule which properly takes into account the factors which affect flight time and the carrier's experience with the particular flight, the government can require nothing more," AA argued.

ATA termed the rule an "invitation to evasion." "Because it is arbitrary, unreasonable, uncertain and vague," ATA added, "it is a completely unsound and unworkable approach to the scheduling problem."

### CAB recommends National for Buffalo-Miami route

The CAB staff, which withdrew its original support for a Buffalo-Miami route for Capital Airlines, has recommended National Airlines for the route which is at issue in CAB's Great Lakes-Florida Service Case.

Examiner William F. Cusick, in a Nov. 5, 1957 report, recommended National for a Chicago-Miami route and Capital for the Buffalo-Miami segment. Subsequently, CAB counsel V. Rock Grundman withdrew staff support of Capital on grounds that Capital's equipment plans have been changed from those used in the Great Lakes-Florida Case.

Specifically, Grundman referred to Capital's deferral of additional Viscount plane deliveries. His new recommendation for National thus amounts to staff support for NAL for both the Chicago-Miami and Buffalo-Miami routes. No change has been made in Examiner Cusick's recommendations.

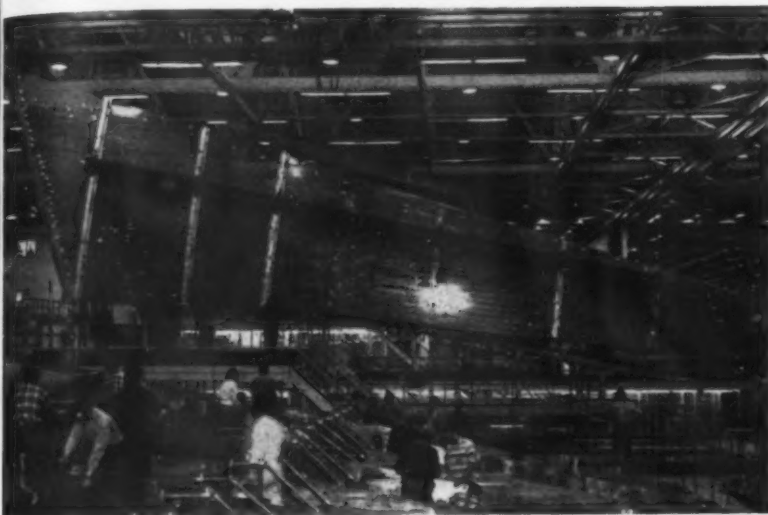
### Indian airline flies French Noratlas transport; may buy six

KALINGA AIRLINES of India recently operated an SNCA du Nord Noratlas experimentally. This model of the French transport is powered by two P&W R-2800s with two Turbomeca Marbore tip jets. The carrier is reported to be planning to buy six Noratlases for use between Calcutta and Lhasa, capital of Tibet.





## Boeing Intercontinental wings shape up



COMPONENTS for the Boeing Intercontinental jet transport, largest of the 707 series, are coming off assembly lines. First wing panel is moved from its jig to become part of Pan American World Airways' first 707-320 model. PAA has 17 of the big planes on order. It holds position 13 on the Boeing 707 production line.

## CAB upholds Capital's extension of family fare

CAB has denied petitions for reconsideration filed by American Airlines and United Air Lines in the Capital Family Plan Case. Case involves Capital Airlines' scheduling Saturday as a half-fare family-plan day and protests of other lines that contend the plan should be continued solely as a stimulant to mid-week traffic.

Board voted in October to defer decision in the case until completion of the newly instituted industrywide family-plan investigation. American and United objected on grounds that the Capital plan was "unjust and unreasonable, unjustly discriminatory, and unduly preferential and prejudicial." The Board, in turning down their protests, ruled that the petitions did not "establish error or otherwise establish that the relief is warranted."

As in the initial decision, Vice Chairman Gurney dissented insofar as the majority failed to reach a final decision, and Member Denny voted outright against Capital's Saturday plan, which he termed "unjust and unreasonable."

## Pending court actions cloud aircraft depreciation rule

A new rule, under which CAB, for the first time, will prescribe specific aircraft depreciation rates and residual values, went into effect Jan. 1. But numerous pending Court actions clouded actual status of the rule.

Advanced in final form by the

agency in November, it was promptly taken to the U.S. District Court in Washington, D.C. by six domestic trunk airlines. They did not ask a stay of the Jan. 1 effective date but sought to have the regulation overturned by the Court. In the absence of a stay, the rule went into effect although CAB has until mid-February to answer the suit.

Meanwhile, a separate though related CAB depreciation rule is currently at issue in the U.S. Court of Appeals. It deals generally with CAB's plan to specify which items may be depreciated on a carrier's books. CAB was upheld on this rule in the District Court and the airlines appealed.

At presstime, the carriers asked the Appeals Court to defer action on the earlier case pending outcome of the new suit in the District Court.

Thus, the new rule is actually in effect but whether carriers will be forced to abide by it apparently hinges on outcome of the pending Court matters.

## TWA delays choice of Burgess' successor

Trans World Airlines was functioning without a president at presstime, and there was no indication that any progress had been made toward picking a successor to Carter L. Burgess.

After less than a year in office, Burgess resigned effective Jan. 1 as president and a director because of "disagreement over airline policies" (see editorial, page 7).

The resignation was announced by Burgess and Howard Hughes, presi-

dent and owner of Hughes Tool Co., which owns 77.6% of TWA's stock. "Mr. Burgess has brought great energy, dedication and devotion to TWA in the year he has served the airline, and I regret that we simply cannot agree on airline policies," Hughes said. The resignation, described as "friendly," was accepted by the TWA board "with regret."

TWA operated during the entire year 1956 without a president, following the death of Ralph S. Damon. Burgess took over on Jan. 23, 1957. Board chairman Warren Lee Pierson is expected to handle policy matters until Hughes makes up his mind on a new president.

Burgess served TWA in a minor executive capacity after World War II and was an Assistant Secretary of Defense before becoming the airline's president.

## Airline union leaders discuss furloughs, layoffs

Concerned over recent furloughs and layoffs of personnel by the airlines, the Flight Engineers' International Association, AFL-CIO, has called for a meeting of aviation union leaders to discuss employment problems. No date or place for the meeting was set.

George R. Petty, Jr., FEIA president, cited "recent reports of the furlough of 90 American Airlines copilots and termination of 110 United Air Lines mechanics" as a source of concern. These actions, he said, are probably the beginning of a significant fluctuation in airline employment due to introduction of jet aircraft.

## Alaska Airlines applies for route to Siberia

Alaska Airlines has applied to the Civil Aeronautics Board for an extension of its routes to Irkutsk, USSR. Point is located in Siberia, north of Mongolia and on Lake Baikal, described as "one of the most picturesque parts of the country."

Three segments were proposed in the Alaska application. One would begin at Anchorage, Alaska, a second at Fairbanks, Alaska, and a third at Seattle. All three would be via Nome, Alaska and "any other intermediate points in the Soviet Union for which operating rights may be secured," thence to Irkutsk.

Alaska, whose president is Charles F. Willis, Jr., former aide to President Eisenhower, noted that the Soviet travel agency Intourist has announced that foreign tourists may travel in Siberia. Alaska said it believes this will be of "tremendous appeal to the American tourist who should be routed via the Territory of Alaska so that the Territory may have the advantage of stopovers in Alaska."

## BRIEFS

**Capital Airlines'** insurance company, Aero Associates, filed a \$932,800 suit against Vickers-Armstrongs Ltd. for damage to a Viscount that made a belly landing at Chicago's Midway Airport in 1956. Aero Associates, which had paid Capital \$1.1 million for the plane shortly after the accident, sued under its right of subrogation in an attempt to recover its money, a Capital spokesman said. The insurance company sold the plane to Vickers for \$167,200, and the \$932,800 represents the difference between the sale price and \$1.1 million.

**Independent Airlines Assn.** named Maj. Gen. John P. Doyle, USAF (Ret.) to serve as executive director. Doyle was former director of transportation for USAF. IAA is the organization resulting from the merger last May of Aircoach Transport Assn. and Independent Military Air Transport Assn.

**Headquarters** of Northeast Airlines' new president, James W. Austin, and Nelson B. Fry, v.p.-traffic and sales, have been established in the Bank of Commerce Bldg., Washington, D.C. Two more members of Austin's sales staff at Capital resigned to join NEA. They are J. O. Urquhart, manager of group and convention sales, who had been with Capital 23 years, and M. M. DeGroff, manager of ticketing and ticket sales, a 12-year veteran.

**Mohawk Airlines** became the first U.S. air carrier to employ a Negro stewardess, Miss Ruth Carol Taylor.

**United States Overseas Airlines** returned to service a DC-4 which it salvaged following a crash landing on an ice floe in Hudson Bay. Plane was repaired by Pan American World Airways and the overall cost exceeded the \$500,000 insurance money paid the owners by Lloyds of London, which considered the DC-4 a total loss.

**Northwest Airlines'** 1957 revenues totaled \$82,774,000 against \$76,635,000 in 1956. Passenger-miles rose 10% to 1,201,958,000.

**The Flying Tiger Line** had gross revenues of \$32 million in 1957, a gain of almost \$11 million or 52% over 1956.

**Seaboard & Western Airlines** was awarded a \$4-million contract by Air Materiel Command for carriage of U.S. military dependents between the U.S. and Europe in the first six months of 1958.

**CAB said** the probable cause of the American Airlines Convair 240 accident near Tulsa, Okla., on Jan. 6, 1957, was "the captain's lack of alertness in allowing the first officer to continue an instrument descent to an altitude too low to permit terrain clearance." Accident resulted in one fatality and serious injuries to six.

**New York Airways** named William C. Wold Associates, New York aircraft brokerage firm, to handle sale of its three Sikorsky S-58 and five S-55 helicopters, plus tools, spares, etc. NYA

is considering replacement of the Sikorskys with larger Vertol H-44s.

**Ake Rusck**, former head of the Swedish power administration, became president of Scandinavian Airlines System on Jan. 1, succeeding Henning Throne-Holst, who held the post for three years.

**Western Air Lines** filed in Federal Court in San Francisco to prevent the city from charging "unlawful and grossly discriminatory rates" at San Francisco International Airport. WAL claimed it is paying rates four times higher than those paid by TWA and twice those of United. It seeks to stop the city from collecting a 57% increase ordered in effect last September.

**CAA placed a \$4,691,884 order** with Texas Instruments Inc., Dallas, for production of 14 units of ASR-4, which the agency said will be the fourth, latest and best in a series of airport surveillance radars used to handle air traffic in busy terminal areas. First set of ASR-4 will be installed in about two years.

### Airlines get 58% of Defense travel expenditure in '57

The airlines in fiscal 1957 received 58% of Department of Defense expenditures for travel within the continental U.S.

Out of total expenditures of \$108.4 million, airlines took in \$62,960,494. This was a 15.5% gain over fiscal 1956, when they received \$54.5 million, or 53%, of \$102.8 million.

Railroads in fiscal 1957 did 30.7% of the business (\$33,223,333) compared with 33.7% in the previous year. Pullman dropped from 5.8% in 1956 to 5.4% and bus from 7.4% to 5.9%.

First-class travel on the airlines increased 9.3% to 858,405 passengers. Biggest percentage increase was in air coach, which jumped 72.1% to 120,806 passengers.

Airline passenger-miles totaled 1,250,302,400 (first-class, coach and charter) against 1,012,671,423 for railroads and 538,779,917 for Pullman.

### French government renews PAA, TWA Paris routes

The permits for PAA and TWA to operate from the U.S. West Coast to Paris have been extended by the French government until Jan. 31. These permits expired on Dec. 31, by which time the French had hoped the bilateral consultations in Washington would have gained a reciprocal "polar" route for Air France.

Since the talks were unsuccessful but did not result in denouncement of the 1946 bilateral, the French decided to extend the permits for a month. Some positive action on the bilateral situation (discussed on page 63) will probably be taken by the French before the end of January.

### Airline safety record for 1957 second best

The year 1957 was one of the U.S. scheduled airline industry's safest years, with passenger fatalities of only 0.2 per 100 million passenger-miles, the Civil Aeronautics Administration reported.

Bettered only by 1954, when the figure was 0.1, the 1957 result compared with a fatality rate of 0.5 in 1956. The domestic segment of the industry showed 0.1 last year against 0.6 in 1956, while foreign and overseas was 0.6 against 0.0.

Domestic revenue passenger-miles totaled 25.5 billion in 1957, up 14% over 1956, while passengers increased 8% to 45 million, CAA said. Foreign and overseas passenger-miles were up 13% to 5.8 billion and passengers gained 5% to 4,150,000.

Handling of a 21% increase in instrument flying was made possible by an increase from 9,100 to 10,500 in the number of traffic control personnel, installation of additional facilities, 43 high frequency omnidirectional radio ranges, and use of long-range radar at Washington, New York, Chicago and Norfolk, CAA said.

### Henzey, Vandyk win TWA writing contest

William V. Henzey, chief transport editor of American Aviation Publications, and Anthony Vandyk, international editor, were judged winners in Trans World Airlines' 20th annual aviation writing and picture competition.

Henzey was named writer of the best business and financial story and also received the sweepstakes award in the technical division. Vandyk was the writer of the best operations and engineering story.

### Eastern asks suspension of night coach fare cut

Eastern Air Lines has asked CAB to suspend a 20% reduction in night coach fares filed by National Airlines for application to certain East Coast flights. But both Eastern and Northeast Airlines, NAL competitors, have filed "protective" tariffs in case CAB permits the reductions to become effective.

NAL's tariff bears a Jan. 13 effective date. If approved by CAB, tariffs of EAL and NEA would become effective shortly thereafter.

Eastern termed the new fares, applicable to 16-day roundtrip excursions operated on designated days of the week, to be "unreasonable." Northeast also voiced opposition but did not ask CAB to suspend the tariffs.

National, in answer to the protests, said the fares will result in increased profit for National and its competitors.

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**SUPERSONIC SCORE KEEPER** —Seek-and-kill power of United States air defense weapons of the future will be tested by modern aerial target systems like the supersonic USAF XQ-4 developed by Radioplane Division of Northrop Aircraft, Inc. The XQ-4 can duplicate the performance of a modern high-altitude bomber or missile. Latest of a long series of Radioplane aerial target systems, it tallies up the score of theoretical hits and near misses and is recovered by parachute for repeated use. Today, other Northrop divisions are building the first intercontinental guided missile, the USAF Snark SM-62; the revolutionary supersonic twin-jet USAF T-38, first of an entirely new family of light-weight, low-cost aircraft; and the new low-altitude ground-to-air missile, U.S. Army Hawk, with Raytheon Manufacturing Company. Advanced Northrop engineering and production techniques will continue to lead the aircraft and missile industry in providing low-cost solutions to defense problems.



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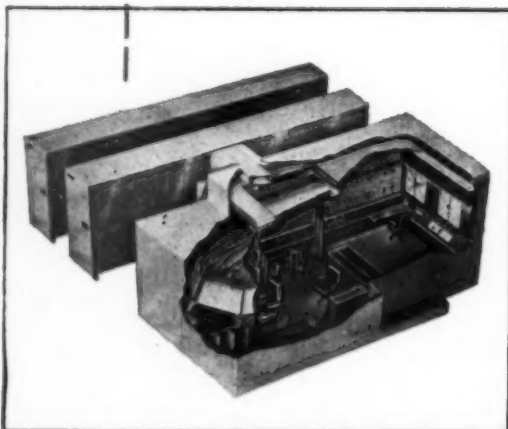


PHOTO — COURTESY U.S. AIR FORCE

## 50,000 FEET UP-

with feet still on the ground

ERCO PROVIDES CRITICAL TRAINING  
FOR CREWS OF THE KC-135.



The recent globe-circling feat of the SAC, B52 in the amazing time of 45 hrs. 19 mins. could have been 5 to 6 hours less — if the all jet KC-135 had been in operation to perform the refueling. Very soon the KC-135 will become fully operational and the crews of these giant 500 mph. tankers will be *fully trained* — thanks to the ERCO Flight Simulator. ERCO — one of the recognized leaders in the field of synthetic training devices was selected to design and build the KC-135 Simulator.

In addition to the KC-135 Floor Based Simulator shown here ERCO has designed, built and delivered more trailerized flight simulators than all other manufacturers combined.

Let us help you with your training problem! Write today to ERCO Dept. MS, Riverdale, Md., for the brochure, "Synthetic Training Devices" and learn how ERCO devices can assist you.

# ERCO

### Country slickers?

Boeing controller Clyde Skeen, in a recent New York speech, referred briefly to the article in *Fortune* which called Boeing salesmen "hicks" and their sales techniques "amateurish." "I can assure you that this group of Boeing people have had some interesting times down on the farm, and to date, the crop has been quite good," Skeen noted.

### An attractive addition

Northeast Airlines is installing an attractive porthole-like lighted route map at each of its system ticket counters. It's about 4 ft. in diameter and displays the eastern half of the U.S. on a convex glass face. Designer is Sam Ayres Associates of Boston and fabrication was handled by Norman Buffet Display Co. of Boston and Sanford, Me. at cost of \$135 each.

Suggestions: the blue "land" and green Atlantic Ocean makes one stop and reorient himself to figure out what's what. And Nassua is strange spelling for the Bahamian city.

### Technical accuracy

If you've noted the technical accuracy in the fine multi-colored advertisements of Convair, credit goes to Fred Korth of Buchanan & Co.'s Los Angeles office. Artist Korth goes to such lengths in research that if an ad appearing in April has the night sky in the background, the position of the stars is accurate as of that month. He spends a lot of time in libraries making sure every detail in the ads is correct.

### Sky Chefs not bidding

After indicating interest earlier, Sky Chefs, Inc., American Airlines' catering subsidiary, didn't enter a bid in the competition for the restaurant concession at the new Los Angeles International Airport terminal. It's estimated the concession will require a \$2-million investment and AA's equipment program just about rules out any sizable capital investment in any other direction right now.

## Jet aids daily double

Found, a new use for jet engines. The Santa Anita race track in California is using an Allison J35 engine rigged up to make an evaporator-dryer machine to dry out the track after heavy rains.

**You figure this one**

Longren Aircraft, Torrance, Calif., has established a new program in which employees this year do not work the first Monday in each month, but work the following Saturday instead.

This will give workers eight three-day and four four-day weekends this

year by combining legal holidays with weekends.

**It's complicated, but it works out.**

**It becomes crystal clear**

Oh, take me away  
From the sick cliché  
And the slogan splashed on the chart.  
I'm stricken dumb  
And my ears go numb  
With the drumming "state of the art."

If we must be trite  
In the verbal fight  
Let's drop the pompous fizz,  
And face the fact that the state of  
the art  
Is simply the way things is.

**MAJ. C. E. THOMSON, JR., USAF**  
*Information Services, Washington.*

### Nostalgia and reality at Midway

Friend of ours had some time to spare between connections at Chicago's Midway Airport, so he wandered down nostalgically to the old terminal to see what it looked like.

It seemed so small that he couldn't believe it was the only terminal for Chicago a dozen years ago. But today

it's brighter and neater and serves Continental, Trans-Canada, Lufthansa, Air France, CMA and some nonskeds.

The real shocker came in the coffee shop. Not better, as unattractive as ever. For old time's sake, he had a chocolate soda. Price had zoomed up to 36¢. Our friend decided to let memories rest in the future.


## Industry talk . . .

Have you heard that in select police circles, ICBMs are referred to as "intercontinental pineapples"?

Although Raytheon demonstrated a model of the principles involved in an infrared proximity warning indicator during opening ceremonies at its new Santa Barbara, Calif., development laboratory, a spokesman for the infrared division said that the company is not working on a PWI system "at the present time."

Newest organizational streamlinings at Northrop Aircraft include: 1) field service, publications, logistics, customer training, operations and administration brought under one director, Lee H. Smith—saving target, \$250,000 annually; 2) highway and internal transportation department consolidated under Materiel—saving target, \$87,619 annually.

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# THE *Executive* HOTEL

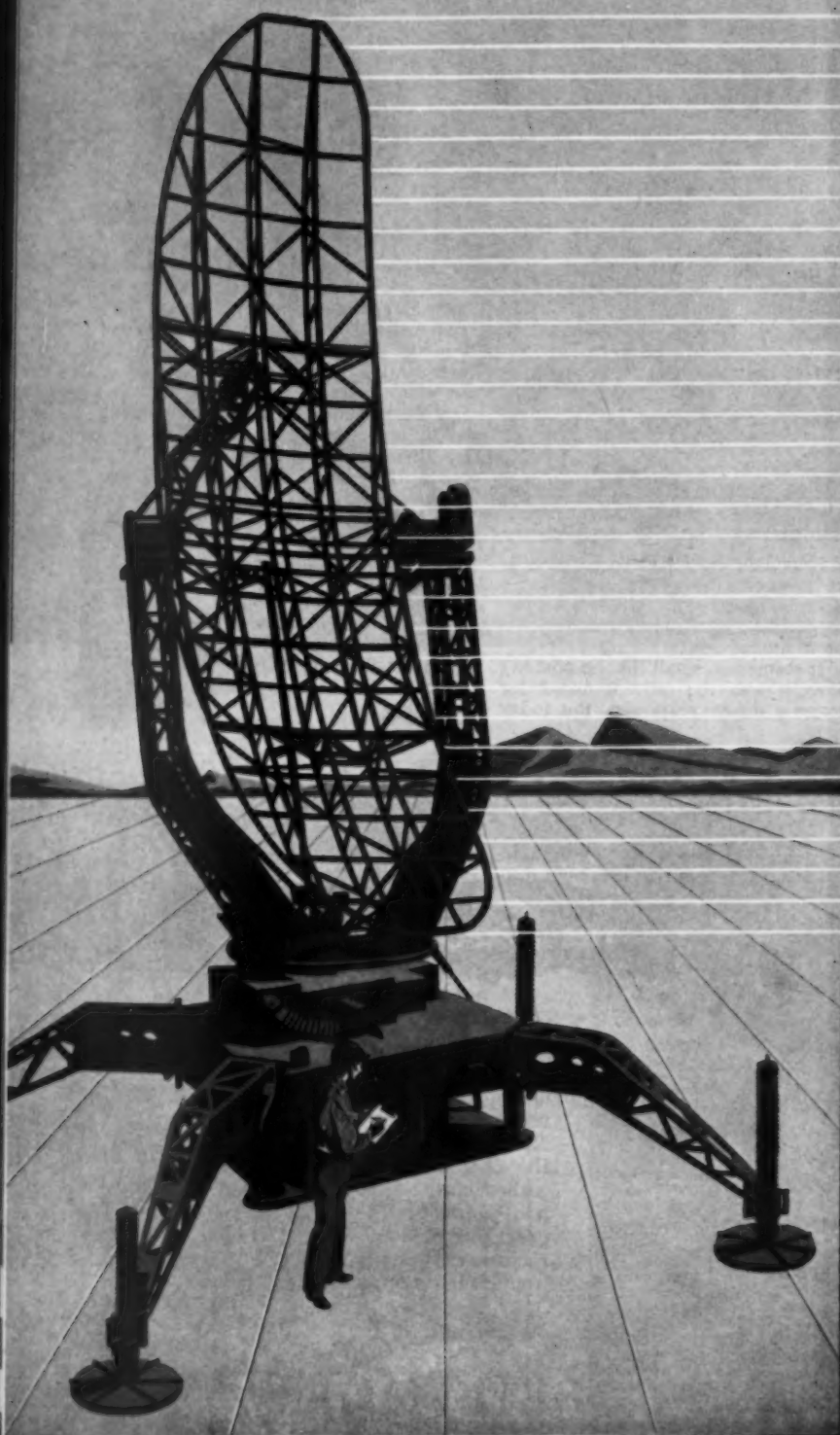
**FOR AVIATION!**

Top executives make The Biltmore their New York headquarters. It's so convenient to all of midtown New York...and home of the famed Wing's Club, gathering place for aviation people. Newly decorated guest rooms, lobby, meeting rooms and restaurants. Year 'round air-conditioning, too.

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 A Realty Hotel  
*Harry M. Anholt, President*

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**Avco makes things better for America**

# Avco

**Avco today**

## Crosley Height Finder has range, will travel

Mighty radar stations are the fixed listening posts of America's continental air defense system. But they are not enough. Troops on the move also need warning of approaching hostile aircraft.

A new radar was needed. It had to be light enough for easy transport, tough enough to withstand campaign conditions and powerful enough to scan heights beyond the reach of any device previously available. The assignment of designing, building and producing it was given to Avco's Crosley Division. The MPS-16 height finder is the result. Working in cooperation with the ARDC's Rome (N.Y.) Air Development Center, Crosley has given the Air Force and Marine Corps another great contribution for national defense.

### THIS IS AVCO

Avco today is a diversified organization whose products include aircraft power plants and structures, electronics for defense and industry, and specialized home and farm equipment. Avco's divisions and subsidiaries are:

Lycoming—aviation, marine and industrial power plants...Crosley—electronics systems and aircraft structures...American Kitchens—kitchen equipment and architectural porcelain...New Idea and Ezee Flow—specialized farm equipment...Research and Advanced Development—missile and allied research...Crosley Broadcasting Corporation—the WLW radio and TV group...Moffats Limited (Canada)—commercial gas and heating equipment.

*Scientists interested in unusual opportunities for advancement can grow with Avco.*

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## Vive le bilateral . . . but not for too long

by Anthony Vandyk

"IT IS NO GOOD," the Frenchman said as he sipped the Statler Hotel's best Chablis wine.

For a moment it seemed that traditional Gallic politeness had gone through the plate glass veranda windows on to Washington's 16th Street. But it wasn't the wine that caused his bitter comment. It was the 1946 bilateral air transport agreement between the United States and France, which the French had come to Washington to try to amend.

What do the French want? In a nutshell—liberty, equality and fraternity! If you listen to the French side, you will be told that the French took quite a beating in 1946. The agreement signed in that year theoretically looked fair. France notably got routes to specific points in the U.S. from any points in France while in return the U.S. got routes to specific points in France from the U.S.

The catch, as the French found out, was that while there is little or no traffic between major French cities other than Paris and the U.S., there is plenty from most major cities in the U.S. to France. And under the present bilateral, there is no reason why U.S. operators cannot fly from every major city in the U.S. to France.

The French are not allowed to re-

ciprocate and this is the main reason why they want to change the present bilateral agreement. Their particular "beef" at present is that Pan American and TWA are able to fly from Los Angeles and San Francisco to Paris while Air France is not permitted to serve the U.S. West Coast.

This would be bad enough, the French say, if no other foreign carriers were allowed to fly to the West Coast. But in fact the U.S. has permitted the airlines of Britain, Scandinavia and Germany to fly to the West Coast. And only last year the U.S. gave the green light to Australia's Qantas to link San Francisco with London, an operation which gets under way this month.

The French, of course, would dearly like to see Air France too become a globe-girdling carrier. Bilateral changes they want include a lot more routes than just one to the West Coast. To give Air France a round-the-world route would probably mean a West Coast-Tokyo connection.

Then there is the ambition of TAI, the French independent airline, to link French territories in the Southwest Pacific with Honolulu and the West Coast. TAI already flies from Paris to the South Pacific via Asia and Australia. It has long dreamed of opening up Tahiti and the other French beauty

spots in the Pacific to U.S. tourists.

The other major French independent, UAT-Aeromaritime, has indicated that it wants a route to the U.S. from French Africa. Space does not permit the enumeration of all the other new routes France wants for its airlines, but there are plenty.

What justification is there for giving France any or all of the routes it wants? Legally there is none. The French know this. So they are prepared to tear up the 1946 bilateral and accept the consequences if the U.S. stands firm and says "Sorry, gents." Tearing up the agreement would mean that one year later all services between France and the U.S. by French and U.S. carriers would cease unless a new agreement were worked out.

The only basis on which the French can hope to gain new routes is by giving something to the U.S. that U.S. carriers want: additional traffic rights between French territories and foreign countries.

PAA and TWA already enjoy substantial "fifth freedom" traffic rights out of France. With a couple of exceptions, there are few more that could be given that would prove of any substantial benefit. Yet the French feel that the U.S. carriers already have too many traffic rights out of Paris!

### How airline traffic has developed since 1945

In 1958 the airlines of the world will carry close to 100 million passengers, according to the International Civil

Aviation Organization. This ICAO-prepared table shows development of traffic since 1945.

Year	Miles flown	Hours flown	Passengers carried	Passenger-miles	Cargo ton-miles	Mail ton-miles	Average passengers per aircraft	Average miles flown per passenger	Average miles flown per hour
	(millions)								
1957	1,760	8.8	87	51,000	1,150	300	29	585	200
1956	1,580	8.0	77	44,000	1,030	280	28	575	200
1955	1,430	7.4	68	39,000	910	260	27	570	195
1954	1,290	6.7	58	33,000	770	230	26	565	190
1953	1,190	6.4	53	29,000	720	190	24	560	185
1952	1,100	6.0	46	25,000	680	180	23	545	183
1951	1,010	5.6	42	22,000	640	170	22	520	180
1950	890	5.0	31	17,000	530	140	19	548	177
1949	840	4.8	27	15,000	390	130	18	545	175
1948	790	4.6	24	13,000	290	120	17	550	170
1947	710	4.2	21	12,000	180	90	17	560	165
1946	580	3.8	18	10,000	80	70	17	530	155
1945	370	2.5	9	5,000	70	90	13	545	150

Years	Annual increase or decrease									
1956-57	+ 11%	+ 10%	+ 13%	+ 16%	+ 11%	+ 7%	+ 4%	+ 2%	+ 2%	
1955-56	+ 10%	+ 8%	+ 13%	+ 15%	+ 14%	+ 8%	+ 4%	+ 1%	+ 2%	
1954-55	+ 11%	+ 10%	+ 17%	+ 17%	+ 18%	+ 15%	+ 4%	+ 1%	+ 2%	
1953-54	+ 8%	+ 5%	+ 12%	+ 13%	+ 8%	+ 18%	+ 8%	+ 1%	+ 3%	
1952-53	+ 8%	+ 7%	+ 13%	+ 18%	+ 5%	+ 8%	+ 4%	+ 2%	+ 2%	
1951-52	+ 9%	+ 7%	+ 10%	+ 14%	+ 8%	+ 8%	+ 5%	+ 5%	+ 2%	
1950-51	+ 13%	+ 12%	+ 35%	+ 25%	+ 21%	+ 20%	+ 16%	+ 4%	+ 2%	
1949-50	+ 7%	+ 4%	+ 15%	+ 17%	+ 35%	+ 5%	+ 6%	+ 1%	+ 2%	
1948-49	+ 6%	+ 4%	+ 13%	+ 14%	+ 36%	+ 12%	+ 6%	+ 1%	+ 2%	
1947-48	+ 11%	+ 10%	+ 14%	+ 11%	+ 56%	+ 31%	...	+ 1%	+ 2%	
1946-47	+ 21%	+ 11%	+ 17%	+ 19%	+ 125%	+ 30%	...	+ 6%	+ 8%	
1945-46	+ 57%	+ 32%	+ 100%	+ 100%	+ 9%	+ 23%	+ 31%	+ 3%	+ 4%	

## PEOPLE



HUSTED



RANDALL



LANDRY



MILLER



GEYER



KAHN

### Manufacturing

Name	New Position	Former Position
Richard S. Husted	Mgr. oper., Westinghouse Aviation Gas Turbine Div.	Eastern sales mgr., Westinghouse Div.
Frank Randall	Pres., Ampere Electronic Corp.	VP and gen. sales mgr.
Walter Landry	Dir. quality control, Electronic Communications, Inc.	Exec., Hughes Aircraft Co.
T. Guy Miller	Mgr., Beechcraft Super 18 sales, Beech Aircraft Corp.	Beechcraft distributor, Philadelphia
George E. Geyer	Pres., All-Tronics, Inc.	Asst. to pres., Control Instrument Co.
Robert Kahn	Head, subsystems procurement dept., Convair Div., Ft. Worth	Mgr. material
Dr. Joseph Seton Smith	VP and treas., All-Tronics, Inc.	Dir. defense engrg., Control Instrument Co.
R. T. Silberman	Pres., Kin Tel Div., Cohu Electronics, Inc.	VP, Cohu Electronics, Inc.
Thomas M. Hamilton	Admin. vp, Millivac Div., Cohu Electronics, Inc.	VP, Cohu Electronics and admin. vp, Kin Tel
Roy Jackson	Resigned	Chief engr., Northrop Div., Northrop Aircraft, Inc.
Donald K. Taaker	VP, Marquardt Aircraft Co.	Mgr., ramjet mfg. plant, Ogden
Frank W. Fink	Mgr., electronics div., Ryan Aeronautical Co.	VP and chief engr.
E. A. Bellande	Chm. bd., The Garrett Corp.	Vice pres.
George B. Gelly	Management consultant, specializing in govt. relations	Corp. secy., Douglas Aircraft Co.
Robert J. Love	Sales mgr., Transport Helicopters, Inc.	Flight supv., military relations dept., Northrop Aircraft, Inc.
Samuel K. Lackoff	Pres., Electronics Div., Van Norman Industries, Inc.	Head, Transatron, Inc.
W. D. Eikenberry	Head, govt. relations dept., Commercial Aircraft Div., Cessna Aircraft Co.	Requirements sec., Military Aircraft Div.
John H. Roy	Mgr., aircraft sales, Townsend Co.	With Cherry Rivet Div.
Col. Leonard F. Harman (USAF, ret.)	On staff, GE Aircraft Nuclear Propulsion Dept.	Asst. to bd. chm. and gen. mgr., Northrop Aircraft Co.
Morgan Chase	Head, mfg. sales dept., Lockheed Aircraft Corp.	Mgr., purchased equipment dept.
Homer L. Marrs	VP and oper. mgr., Motorola Communications and Electronics, Inc.	VP and midwestern area sales mgr.
Harold A. Jones	VP and midwestern area sales mgr., Motorola	Staff dir. of sales
Paul Kaskey	Personnel mgr., Western Div., Aeroquip Corp.	With ACF Industries, Inc.
Thomas S. Mederos	Sales asst. to pres., Applied Science Corp. of Princeton	Mgr., instrumentation Div.
Robert E. Navin	Mgr. instrumentation Div., Applied Science Corp. of Princeton	Asst. mgr.
Clifford B. Smith	Sales mgr., BJ Electronics, Borg-Warner Corp.	Mgr., field representation, Farnsworth Electronics
Ivan Calicoat	Mgr. tech. service, Dana Corp.	Mgr., Aircraft Gear plant
Seymour Richman	Dir. adv. and pub. rel., Greer Hydraulics, Inc.	Mgr. adv. and sales promotion, Auth Electric Co., Inc.
B. N. Snow	Resigned	VP, The Garrett Corp.
Forbes Mann	Dir., long range planning, Chance Vought	Program control mgr.
R. D. Chandler, Jr.	Mgr., Field Div., Stavid Engineering, Inc.	Asst. mgr.
Leon T. Noel	Exec. asst. to secy. and treas., Ryan Aeronautical Co.	VP-finance, Solar Aircraft Co.
Percy L. Spencer	Sr. vp, Raytheon Mfg. Co.	Head, Microwave and Power Tube Div.
J. W. Woodruff	Mgr., customer relations, BJ Electronics, Borg-Warner Corp.	With Convair Astronautics
George S. Knopf	Mgr., tape-run production systems unit, Bendix Aviation Corp.	Exec. engr., Research Laboratories
John H. Hunt	Dir. mfg., Stavid Engrg., Inc.	Production mgr.
C. J. Jordan	Production planning mgr., Stavid Engrg., Inc.	Planning supv., Mfg. Div.
Samuel B. Fishbein	Asst. gen. sales mgr., Military Operations Dept., Allen B. Du Mont Laboratories, Inc.	Mgr., New England Military Operations office
Robert C. Bickel	Sales mgr., Andrew Corp.	Regional mgr.
W. D. Russell	Secy. and solicitor, Canadian Applied Research Ltd.	Secy. and solicitor, individual companies in Hunting Group
F. G. Jeffrey	Dir. sales and service, Canadian Applied Research Ltd.	Salesman
Stuart G. McGriff	Product mgr., Callery Chemical Co.	Head, economics and market research
Virgil Pettigrew	Mgr. estimating and controls, Temco Aircraft Corp.	Supt. quality control engrg.
John E. Schwartz	Export regional sales mgr. for South America, Cessna Aircraft Co.	In coffee exports
Tom Kennett	Resident sales rep. for export, Cessna Aircraft Co.	Export sales administrator

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Ronald A. Krauss	Dir. publicity, Mohawk Airlines	Staff asst., press relations
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William A. Gebenini	Dir. Aeronautics for State of Washington	Mgr. Renton Municipal Airport
Ray Ireland	Consultant to Lt. Gen. William H. Tunner, USAF	VP-traffic admin., United Air Lines
	Deputy Chief of Staff-Operations	

# U.S. Steel tests new process of rolling thin steel sheets up to 90-in. wide



STAINLESS STEEL sandwich is inspected by James Noble prior to rolling.

United States Steel Corp. is experimenting with a process that rolls thin stainless and alloy steel sheets to widths never before achieved. The trick is "sandwich" rolling.

Realizing that weight is a premium, U.S. Steel is studying a way to eliminate many of the joints and seams now necessary in the fabrication of airframe parts and skins from narrow sheets. Through the USS process, developed by Howard S. Orr, it has been demonstrated that sheets up to 90-in. wide may be produced. This is nearly twice the width of light-gauge stainless and alloy sheets being made by conventional methods. Wider sheets are in the offing.

At the same time, the advantages of steel—strength, toughness and resistance to heat and corrosion—are retained.

The new method consists of sandwiching stainless or alloy steel plates between two heavier plates of ordinary carbon steel, closing the assembly with welded-in side- and end-bars. The sandwich is heated and rolled.

One of the experimental sandwiches contained four 12% chromium stainless plates, each 5/16-in. thick, enclosed in cover plates each one-inch thick.

The sandwich was heated by conventional methods and rolled to a plate 3/8-in. thick, 100-in. wide and 250-in. long.

This is a thickness reduction of about 90%. The reduction is effected in each layer of the sandwich. As a result, the original 5/16-in. stainless plates were rolled out to a nominal thickness of .033 in. each. When the expendable end and side bars were sheared off to

open the sandwich, the stainless sheets measured 90 in. by 230 in.

Because the covering plates govern the working characteristics of the sandwich assembly, no revamping of rolling mills to supply more power or stiffen the rolls is necessary.

USS is now focusing its attention on refining the technique and making studies to determine the best sandwich design and assembly methods.

## Federal court dismisses suit against Dr. Stewart

A two-year-old damage suit brought against Dr. R. B. Stewart by North Central Airlines has been dismissed by Federal Judge Luther M. Swygert pursuant to a stipulation signed by parties last month.

Dr. Stewart, currently a director and member of the executive committee of Lake Central Airlines, at one time held a similar position with NOR. The NOR suit, brought in U.S. District Court, Northern District of Indiana, sought \$107,473 in damages.

Dismissal of the suit bars further action by NOR unless North Central is successful in upsetting CAB's July 9, 1957 decision which denied NOR's bid to acquire assets and routes of ICA, according to the stipulation.

## Correction

In the Dec. 16 issue of AMERICAN AVIATION (p. 50) a headline inadvertently conveyed the impression that the Senate Permanent Investigating Subcommittee had "cleared" former CAB official Raymond Sawyer of the "leak" of CAB's 1956 decision in the New York-Florida Case. It was a special three-man CAB committee which exonerated Sawyer and the forthcoming Senate report will include a CAB letter as to those findings.

The Senate group, of course, is not called on to "clear" or accuse Sawyer of the leak or to express agreement with the CAB findings. Recommended action by the Senate group in its report will be limited to proposed legislation.

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## TRANSPORT CHANGES

**E. R. Mathews** promoted from chief mechanic for Northwest Airlines at Seattle-Tacoma International Airport to mgr. of line's Seattle Service Base.

**Miss Mildred (Jackie) Jackson** appointed director of Women's Div., Customer Service Dept., American Airlines.

**H. L. Cummings** named public relations rep. for Northwest Airlines for the Montana area.

**Martin T. Goodwin** appointed dist. sales mgr. for Northwest Airlines at Fargo, N. D.; **Charles C. Greene** named San Francisco dist. sales mgr.

**I. S. Johnson** named mgr. of aircraft service for American Airlines at Midway Airport, Chicago.

**Bruce W. Bolton** appointed dist. sales mgr. for United Air Lines in Reno.

**Manning Kennedy** named asst. to dist. sales mgr. in Washington, D.C.

**Colette d'Orsay** named to be in charge of woman's sales promotion for Air France.

**Henry Reid** appointed sales representative for Seaboard & Western Airlines in Scotland.

**Rex Whitney** appointed auditor, cargo revenue accounting in American Airlines' general office financing section, Tulsa.

**Frank M. Hull**, appointed asst. mgr., Pacific Alaska Div., Pan American World Airways. Other divisional assignments include **H. J. Cregan**, supt. of employee services; **R. A. Winchester**, supt. of personnel; and **H. G. James**, wage and salary coordinator.

**Ben Thomas** promoted to chief accountant, Alaska Airlines; **Robert Christensen** named internal auditor, and **Milton MacRae** appointed property accountant.

**Robert J. Norris** named administrative asst. to vp-engrg. and maint., Pacific Northern Airlines.

**George M. Eichelburg** appointed to head American Airlines' airfreight sales dept. in New York City.

**Joseph A. E. LeBlanc** appointed Tampa-St. Petersburg district sales mgr. for Riddle Airlines.

**Miss Jane C. Neumann** named head Northeast Airlines' personnel dept. in Greater New York area.

## HONORS

**Winston Castleberry**, vp of Southwest Automotive Co., was elected president of the Aircraft Service Assn. for 1958.

Officers of the Aircraft Electrical Society for the coming year are **Peter Duyan, Jr.**, chief electrical engr., Douglas Aircraft Co., president; **A. A. Waldron**, Lockheed Aircraft Corp., vice president; **J. Andrew**, Douglas, secretary; **J. Christie**, Lockheed, treasurer.

**E. O. Cocke, sr.** vp-sales of Trans World Airlines, has been elected president of the Air Traffic Conference for the coming year.

**Robert P. Crago** has been named the outstanding young electrical engineer of 1957 by the Award Organization Committee of Eta Kappa Nu, national electrical engineering honor society, in its annual nationwide talent search. He was recently promoted to Director of Engineering of the Military Products Div. of the International Business Machines Corp.



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## EN ROUTE

by Wayne W. Parrish

### West Australia's frontier: a "whale" of a state

ONE ESSENTIAL to understanding and appreciating Australia is to think in terms of vast areas and relatively small population—some nine million in an area slightly larger than the continental United States.

To be able to think in those terms it is absolutely necessary to fly to Perth on the west coast. The jumping-off place is Adelaide. In the intervening 1,435 miles there isn't enough population even to justify a local air service. All flights are nonstop.

It's five hours by air, two to two and a half days by rail, and three hard days of driving by car. Because of low rail fares, the airlines are getting only 50% of the traffic, which would indicate a good air potential if fares can be knocked down.

Going west was a high adventure to me. I hope you'll find it the same. Just ponder the following. Perth is the capital of the state of West Australia, largest of the six states of the Commonwealth.

Talk about size, West Australia has it. Put together California, Oregon, Washington, Arizona, Nevada, Utah, Idaho AND Texas, and then throw in Tennessee for good measure, and that's West Australia. It is 1,480 miles from north to south, and a thousand miles east and west. It occupies 975,920 square miles, or one-third of the continent.

Yet in this vast area there are only 670,000 people, but more important than that, 365,000 of the total live within the metropolitan area of Perth. This means that 305,000 people are scattered about an area roughly one-third the size of the United States.

It's an expanding frontier, growing quite steadily. Perth itself was founded only in 1829. In 1881, it had only 10,900 people. Outside of mining in the desert interior, most activity is along the coast. There are vast wheat farms and sheep and cattle ranches. The northern part is tropical. Perth is a big trading center, with manufacturing and oil refining coming to the front. The people are friendly and have somewhat the same attitude toward big eastern cities as the people of California have; they couldn't care less.

#### Airlines play major role

In the big state there are only 21,000 miles of surfaced roads, but there are 4,500 miles of railroads which, judging from statistics, are used mostly for freight. There are more than 172,000 motor vehicle registrations. It is quite clear that airlines play a vital role in the state, not only for connections to the east, but up the coast. The MacRobertson Miller airline connects with Darwin 1,969 miles to the north, using

DC-3s to serve a whole series of small towns. There are a few purely local services in the state, too.

And since we're on vital statistics, I can report that beer drinking is as important in West Australia as elsewhere on the continent. The *per capita* consumption per year is 26 gallons. Wine consumption is only 1.68 gallons per capita, while spirits is a measly .03 gallons, indicating that the distillery boys in Scotland have some heavy spade-work to do "down under." (Quality of Scotch in Australia is as bad as it is elsewhere in the Commonwealth areas; the best is shipped to the U.S.) With all the beer drinking they do I can't understand why the Aussies have any kidneys left.

There are two airlines operating from the east to Perth, each good. There is Australian National Airways, taken over by Ansett Aviation since I was there, flying DC-6Bs, and Trans-Australia Airlines, owned by the government, flying Viscounts. The Viscounts have been enormously popular in Australia but on the Perth route they have rather severe load restrictions—34 seats west and 38 east. Very often ANA has to take over the TAA mail and if headwinds are bad the Viscounts have to stop en route to refuel. But the distance is a breeze for a fully-loaded 58-passenger DC-6B.

#### It's a fertile field for jets

Both lines advertise the same flight times. Both leave Adelaide about the same time in the afternoon. And both leave Perth about the same time, just before midnight, for the night hop back to Adelaide. Only one flight per day for each. Perth customers have no choice for schedule convenience—it's a night flight eastbound or take the train. And in five hours there isn't much time to sleep.

Jets will revolutionize the Perth route, making a roundtrip flight easily possible without a night return. However I would suspect that one or both lines would institute a low-fare night flight to compete with the government-owned railroad.

I flew out on the ANA DC-6B. Three stewardesses provided a truly first-class service. Drinks before dinner—and a fine layout of food. There were 47 passengers. Shortly after our takeoff at 3:05 p.m., we swung out over the beautiful harbor and city of Adelaide and flew over some agricultural area which very shortly became desolate desert; and from there to Perth there just isn't anything to see except a coastline with hundreds of miles of unused beaches.

Ever hear of a bight? Well, they've got an awful big one down there which

they call the Great Australian Bight. The dictionary says a bight is a curve in a coastline to form an open bay. The water apparently is relatively shallow and a hazard to shipping. Instead of crossing over the water on a direct route, we hugged the coastline around the bight.

It was after dark when we landed at the airport east of Perth and quite a crowd was on hand to greet most of the passengers. There were only nine of us taking the bus downtown and I then shuttled in a taxi (very inexpensive in Perth) to the Esplanade Hotel. Friendly, comfortable, and a good room, although old-fashioned. The lounges were mobbed with people drinking beer up to the 9 p.m. closing time.

I thought Perth resembled many cities in the U.S., what with its well-lighted main business streets and well-decorated window displays, good stores, the Coke signs, and even drive-in cleaning establishments. Even the gas stations seemed very familiar. But in contrast to the high percentage of American cars in the eastern cities, Perth seems to go more for the small British cars.

#### A Cook's tour of Perth

Although I was in Perth for only 27 hours, I had a fine break. D. H. Bennett, the TAA manager for West Australia, which must be about the biggest on-line sales territory in the world, called me in the morning (it was Sunday) and asked if I'd like to have a tour of Perth. I sure did. So in an hour he drove up in an Australian-built Ford and I had a three-hour tour that covered just about everything.

Perth is 12 miles inland from the Indian Ocean, but is on the Swan River which at that point is so wide I thought it was a bay. However, the river narrows again and the port is Fremantle, an English-looking town of 47,000. Ships up to 30,000 tons can be accommodated. North and south of Fremantle are hundreds of miles of fine beaches.

My hotel overlooked what I thought was a harbor but was merely the wide river. Off to one side of the town rose some bluffs and this turned out to be the 1,000-acre King's Park, kept chiefly in its virgin state, providing fine picnic areas plus an excellent day and night view of the city. Beyond the park is a fine university and residential area with neat homes, almost all with gardens.

It is always warm in Perth but never excessively hot. The first U.S. ambassador to Australia made a hit in Perth by saying that it had the kind of climate California thinks it has; the local citizens will never let that remark die.





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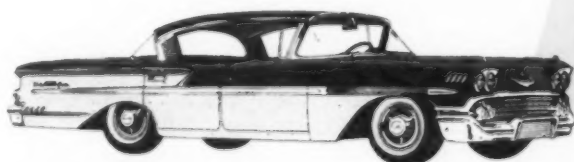
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